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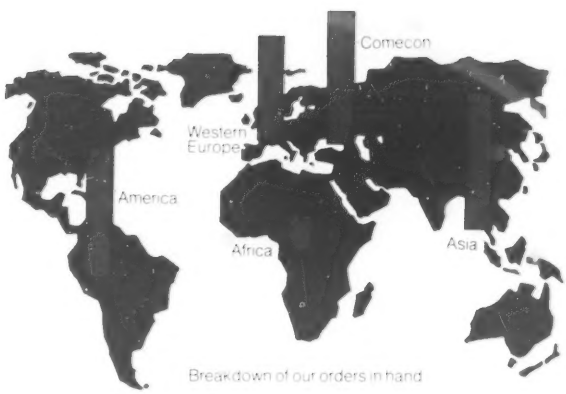

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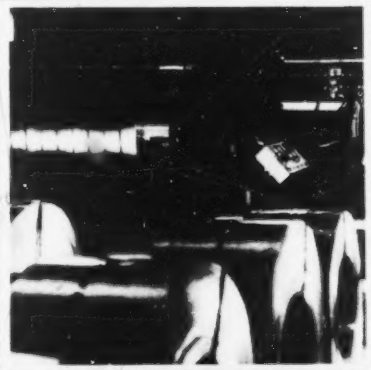

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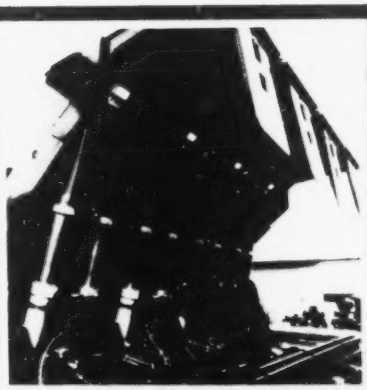

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PREFACE

If testimony were still necessary to the depth, scope and vitality of commercial relations between the United States and the Federal Republic, our annual economic survey provides ample editorial and statistical evidence to satisfy even the most demanding sceptic. That, however, is merely a felicitous byproduct of a publication whose ambitions we attempt to extend each year. And, though the statistical section of our book may be repetitious in the regularity with which it registers expansion in virtually every category, the editorial content represents a serious effort to contribute original thought and analysis each year.

Ideally, we would hope that our survey will analyze the past, discuss the present, and look into the future. In this as in past years, we have been fortunate to receive contributions from a group of men who are leaders in their fields. Within the scope of this effort, we have attempted to balance the theoretical with the practical, successfully we hope.

We have chosen this year to highlight the energy problem, both as it relates to Germany and the United States and in a general framework. The challenges in this arena are truly formidable, but American and German technology will surely play a substantial role in coping with these problems. And solve them we must. Just before Christmas, for instance, the Exxon Corporation's World Enegry Outlook predicted that by the year 2000 the real price of energy will have increased by 50 percent. Exxon's report forecasts that growth in world gross national product will average only about 3 percent a year through 2000, a sharp drop from the 5 percent annual rate that prevailed from 1965 to 1973. Clearly, the energy problem and its fallout will test our fortitude and ingenuity.

For the present and the near future, the times will call for vigilant action. While the United States and Germany witnessed a year of unexciting growth, there are disquieting signs that both of our countries could experience in 1981 some of the economic pain that was widely forecast to strike this year.

Despite the remarkable benefits conferred by the application of free trade principles over the past three decades, protectionism has enjoyed a vigorous rehabilitation in recent times, particularly in the past year. Perhaps at no time since the 1930's has it posed such a general threat to orderly global commerce in the industrial West. It is, then, a tribute to the healthy roots as well as the sturdy trunk of German-American trade relations that bilateral exchanges of goods continued to remain largely unmarred by undercurrents of protectionist threats or innuendo. Within the letter and the spirit of this relationship, the German American Chamber of Commerce will continue to concentrate its efforts on strengthening existing ties as well as promoting new links between the American and German business communities.

In conclusion, I take this opportunity to express my appreciation to the distinguished American and German authors who have contributed their expertise and perspectives to this year's edition. Their articles constitute a valuable analysis of complex problems and issues of our era. Their generous contribution of time and effort encourages our aspirations for this project and for the future growth of trade and commerce between our two countries.

Werner Walbrol
Executive Director
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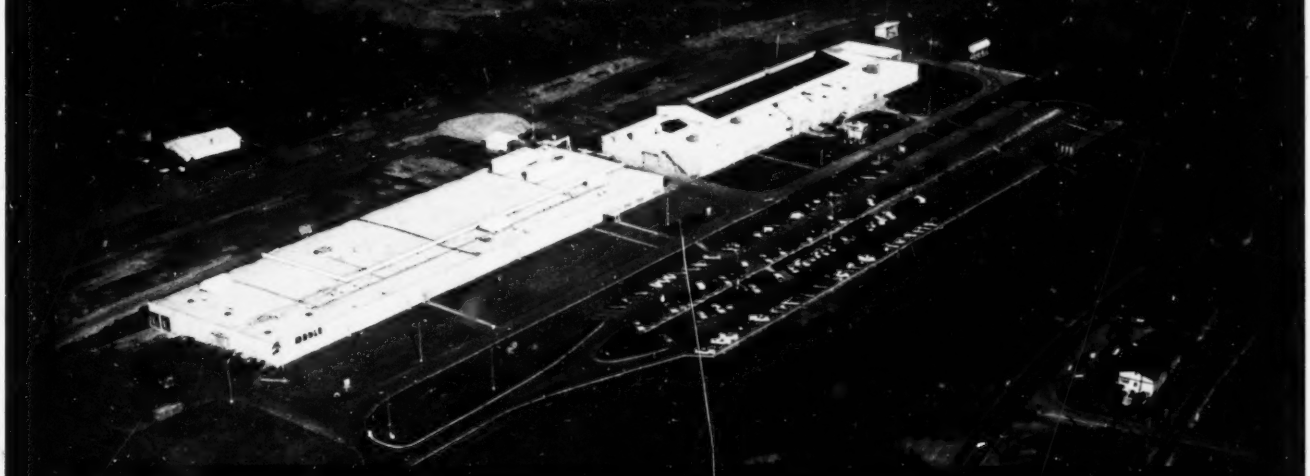

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The View from Washington

by Paul A. Volcker
Chairman of the Board of Governors of the Federal Reserve System

The current recession developed much later than the great majority of economic forecasts had suggested, and then broke with more force than had been generally anticipated. Indeed, the abrupt fall in output this past spring about matched the record postwar decline that occurred in the first quarter of 1975 and was about as large—in percentage terms—as we have typically had over the course of an entire recession. More recently, the rate of decline in economic activity has moderated. Some indicators can even be interpreted as suggesting the recession could be relatively short-lived.

However, the recent record of economic forecasting is warning enough of the uncertainties inherent in judging with precision fluctuations in economic activity. We do know that, whatever encouragement we can draw from some of the most recent data on the near-term outlook, the fundamental forces accounting for some of the persistent problems of the economy remain—poor productivity and low savings, adjustments to sharply higher costs of energy, and, most importantly, the uncertainties and distortions associated with strong underlying price pressures. It is the strength of those forces that seems to me to dictate the main outlines of economic policy.

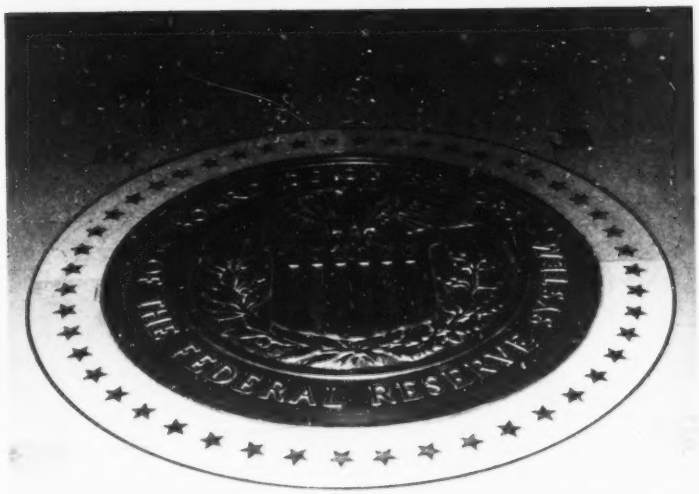
I understand and share the immediate concern about recession. But I am even more concerned that we shape policies that also look toward the medium and longer term needs of the economy, lest we inadvertently extend and repeat the pattern of low productivity, rising inflation, and economic instability.

In that connection, I am convinced the stability and vigor of our economy will not be restored over time unless the ominous cycle of rising levels of inflation in successive periods of expansion can be brought to a halt. We would neglect that prime objective of economic policy at our peril. For that reason, the Federal Reserve has been, and will continue to be, guided by the need to maintain financial discipline, a discipline reflected in reduced growth over time of the monetary and credit aggregates.

As recently as July, the Federal Reserve reaffirmed its ranges for the monetary aggregates that call for a deceleration of money growth in 1980 from the pace during the preceding year. The tentative monetary ranges established for next year specify slightly lower growth. I am glad to say that this approach was supported by the relevant Congressional committees.

In general terms, the targets for growth of the monetary aggregates are designed to encourage progress toward price stability. At the same time we would, of course, like to see resumption of sustainable economic

Statement before the Committee on the Budget, House of Representatives September 10, 1980



growth. In the short run, monetary policy alone cannot guarantee that happy combination of events. Technically, the supply of money tends to be related to nominal GNP, and our targets are consistent with a number of possible combinations of real growth and inflation. If inflation tends to decline, the prospects for satisfactory growth consistent with the targets will be greatly improved. Conversely, to the extent other policies and behavior—public or private—are tending to reinforce inflationary pressures and credit demands, more of the available money supply would be absorbed in financing price increases rather than real activity. Inflationary expectations would tend to keep interest rates higher than otherwise.

Progress on the price front

We cannot escape that problem by simply increasing the money supply to accomodate a higher rate of inflation. The result could only be to prolong and intensify the inflationary process, in turn undermining the recovery and setting the stage for intensification rather than resolution of our economic problems. That is why I believe it so important that all our policies take account of the need to break the insidious pattern of rising rates of inflation in successive cycles—a pattern that, I would remind you, has been accompanied by higher levels of unemployment rather than lower.

"In general terms, the targets for growth of the monetary aggregates are designed to encourage progress toward price stability."

During the spring and early summer, we began to see some slowing of price increases from the exceptional pace of earlier this year, and a zero inflation rate was reported for July in the consumer price index. The concerns over a virtual explosion of inflation rife last winter have rightly receded, an important factor in the sharp declines in interest rates in the spring. Nevertheless, we have to recognize that the improvement so far has been related largely to transitory or short-term factors—a softening in markets for energy and some industrial commodities, favorable supply conditions for food in the spring, and the easing of mortgage interest rates. As you know, food prices have more recently turned up again, and the last reported producer price indexes make less happy reading.

More important than these short-term fluctuations, which are part of the normal dynamics of our complicated economy and reflect in part weather and external developments, the "underlying" or "core" rate of inflation—which is roughly determined by trends in compensation and productivity—has tended to rise in recent years. With no productivity gains to offset wage increases, that core rate appears to be in a 9 to 10 percent range; if anything, the growth rate of labor costs appear to have drifted higher in the first half of this year. There is no doubt that concern about this inflationary performance, and fears of the future, are a powerful force holding interest rates up at present.

One important means of dealing with these wage and cost pressures is to improve productivity. Productivity gains can directly offset cost pressures; over time, moreover, productivity gains are the only lasting source of increases in per worker real income, and rising real income should in turn reduce the pressure for "catch up" wage gains or anticipatory pricing. In that connection, a strong case can be made for tax reduction as a means of increasing investment and productivity. Federal taxes already account for an historically large proportion of income, and in 1981, this ratio could be pushed sharply higher as a result of sizable increases in taxes for Social Security, the windfall oil profits tax, and the inflation-induced bracket creep in the individual income tax. In my view, the size and the composition of the tax burden do have adverse implications for business investment, for costs, and possibly for incentives to work and save.

For those reasons I welcome the emphasis in recent tax proposals to deal as a matter of priority with taxes on investment. But at the same time, tax reduction—whether to assist productivity or to support purchasing

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power—has effects on revenues and the budgetary position that we cannot ignore. If we try to do so, the adverse effects may more than offset the good. For that reason, I believe tax reduction must be conditional on progress in restraining expenditure growth.

Budget restraint

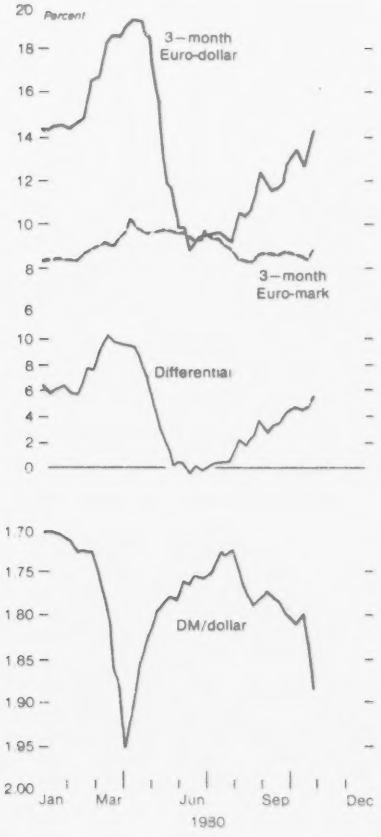
As you know, I fully supported the strong effort to restrain expenditures last winter by the Budget Committees in the House and Senate, and to aim for a balanced budget. With the economy slumping, a budgetary balance is obviously beyond reach today. But government spending will probably be smaller as a result of that Congressional and Administration effort, and the central point is that restraint must be maintained if we are to have a credible opportunity to achieve budget balance in a more fully employed economy.

I am frankly concerned about the size of the expenditure increases projected in the latest official estimates. I recognize that a sizable part of those increases represent a normal, and potentially reversible, response to cyclical developments in the economy. Nonetheless, the trend of our spending, taking account of national security and other needs, plainly limits the amount of tax reduction that would be prudent. To the extent that budgetary discipline is suspended in the face of economic slack, the room for tax reduction could shrink, even to the vanishing point. Indeed, programs and policies interpreted as exacerbating and prolonging the inflationary process can be counterproductive even in terms of economic stimulus, in part through the expectational effects on financial and other markets.

Consequently I cannot emphasize too strongly, if we are to plan on tax reduction, the need to exercise strong restraint over spending and to contain the stresses and strains a huge deficit could place on the economy—especially on financial markets. These markets—both domestic and international—have become so sensitized to inflation and so wary of deficits that the anticipation of excessive spending and more inflation can be as damaging as the reality in driving interest rates higher at home and the dollar lower abroad.

The desirability of tax cuts—particularly those without clear rationale in terms of investment and productivity—also is contingent on the general performance of the economy. Our inability to predict the economic future accurately has been demonstrated often enough. Experience indicates numerous well-intentioned programs of economic stimulus have been ill-timed and excessive. Currently, we are

Interest rates and DM/$ exchange rate



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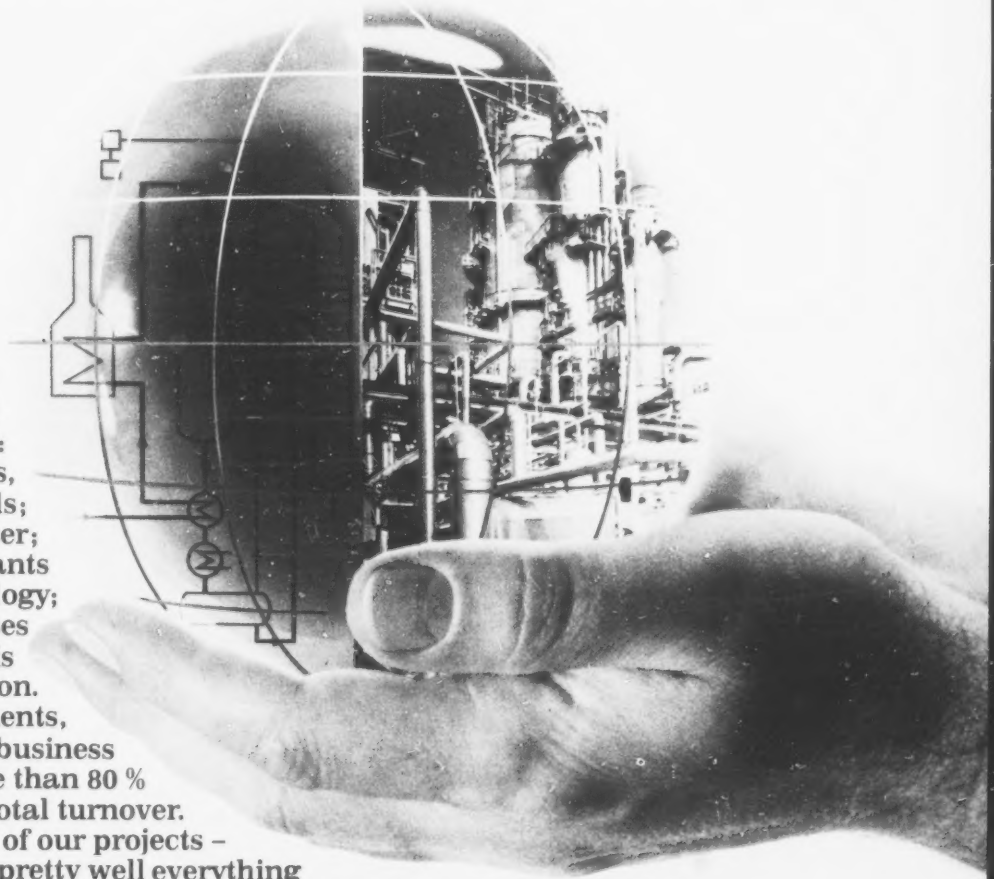

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Mehr investieren, mehr produzieren, weniger konsumieren, Preis-und Lohndisziplin halten, die Abhaengigkeit von auslaendischem Oel verringern und sich dem Wettbewerb stellen, das ist der Weg, auf dem die Vereinigten Staaten nach Meinung des Verfassers mittel—und langfristig das wirtschaftliche Gleichgewicht, Stabilitaet und Wachstum wiedergewinnen koennen. Der Autor traut den Patentmitteln, wie etwa linearen Steuersenkungen nicht zu, die Selbstheilungskraefte der Wirtschaft dauerhaft soweit zu stimulieren, dass es wieder zu einem echten Aufschwung kommt.

Paul Volcker sieht die Grundprobleme der gegenwaertig unbefriedigenden wirtschaftlichen Verfassung der USA in mangelnder Produktivitaet, zu niedriger Sparquote, Zwaengen zur Anpassung an die gestiegenen Energiepreise und schliesslich in den Unsicherheitsfaktoren und Verzerrungen, die von einem ungebrochenen Preisauftrieb ausgehen. Die Federal Reserve, die unserer Bundesbank den Aufgaben nach vergleichbare Einrichtung in den USA, muss nach Meinung des Autors auf ein verringertes und gleichmaessiges Wachstum des Geld—und Kreditvolumens hinarbeiten, um den unseligen Rhythmus zu durchbrechen, mit dem ein rezessionsausloesendes Zinshoch dem anderen nachfolgt.

Im Verlauf seiner Abhandlung geht der Verfasser auf die wirtschaftspolitischen Notwendigkeiten ein, denen sich die Vereinigten Staaten schon im kommenden Jahr konfrontiert sehen werden, wenn ernsthaft der Versuch unternommen werden sollte, die hartnaeckige Inflation auch laengerfristig in den Griff zu bekommen. Der Autor setzt sich besonders fuer eine gezielt auf Investitions—und Produktivitaetszuwachs ausgerichtete Steuerpolitik sowie fuer eine verstaerkte Anforderungs—und Ausgabendisziplin der oeffentlichen und privaten Haushalte ein. Nur im Verein mit konzertierten Massnahmen von Regierung, Unternehmerschaft und Gewerkschaften kann eine stringente Geld—und Kreditpolitik des Notenbanksystems den gewuenschten Stabilisierungserfolg bringen.

arguably near a turning point. One of the questions in that respect is whether the pressures of government financing—or the inflationary outlook generally—may dampen the recovery of significant sectors of the economy, such as housing or automobiles. It would be ironic, indeed, if over-exuberant planning for tax reduction—designed for stimulus—had adverse effects in terms of inflationary expectations and financial markets, interfering with the natural recuperative powers of the economy.

I have made the point before that I would want to defer any decision about the appropriate scope of the tax reduction at least until after the election, when, among other things, we can have a clearer view of the spending priorities of an Administration and a Congress for a period of time ahead, a matter that inevitably can only be clarified after November. I realize you do not have the luxury of foregoing a budgetary resolution. What seems to me important is that the resolution sustain spending restraint. Conceivably, sufficient restraint could be achieved to make it prudent to provide room for limited tax measures aimed at the priority need to stimulate business investment, reduce costs and enhance productivity growth. However, I am doubtful at best that that restraint could be carried to the point of justifying general tax reduction programs at this time, pending reassessment of the budgetary and business situation around the turn of the year.

"We are now at the critical point in our efforts to reduce inflation while returning the economy to a path of healthy and sustainable growth in the 1980's."

Consequences of immoderation

Crucial as monetary and fiscal policies are, many other elements of public and private policy are directly relevant to the prospects for moving toward lower levels of inflation as the economy recovers. With productivity actually declining recently, and faced with higher energy prices, the hard fact is the real income of the average worker will decline. That fact cannot be changed by pushing up nominal wages and prices; the result is more inflation, not more real income. The gains and losses may be reshuffled, but the real performance of the economy will probably be adversely affected in the process. In the context of any given set of monetary and fiscal policies, the end result will be fewer jobs, not more.

Of course, it is much easier to analyze the problem than to find practical means of slowing the wage-price treadmill rapidly and effectively, when fears of inflation are so deeply embedded. I believe it is clear from what I have already said that the answer cannot simply lie in passively accepting whatever increase in the money supply would be necessary to accomodate the inflationary process. To the contrary, I would hope and expect that firm financial discipline—monetary and fiscal—can be one factor encouraging moderation in business and labor behavior. The possibility of relating tax reduction to wage restraint has occasionally been raised, but it seems to me to have received less attention than the question may deserve.

I have not been convinced that a formal, detailed program for linking income restraint to tax reduction, as some have proposed, is practical. Nevertheless, before sizable reductions in personal taxes are considered by the Senate and the House, I believe an opportunity presents itself to explore carefully, with business and labor, the need for a commitment to restraint in wages and pricing during this crucial period in the interests of the economy as a whole, and their own economic well being.

I have spoken many times of the need to develop concerted policies in other areas to help us to achieve and reconcile our economic goals. We need to reduce our dependence on foreign oil—a matter not unrelated to tax policy. We need to attack those elements in the burgeoning regulatory structure that impede competition or add unnecessarily to costs. And, I believe, it would be a serious mistake to seek relief from our problems by a retreat to protectionism, which would risk weakening the forces of competition, reduce the pressures on American industry to innovate, and undermine the attack on inflation.

We are now at the critical point in our efforts to reduce inflation while returning the economy to a path of healthy and sustainable growth in the 1980's. We must not sacrifice that opportunity by neglecting the need to place our immediate actions in the context of a coherent longer-run program. One essential part of that program requires firm discipline over the growth of money and credit. Control over spending and the Federal deficit is another. Any tax reduction that can be fitted into that context should be responsive to the fundamental needs of our economy to improve productivity and investment, to contain costs, and to improve incentives. ■

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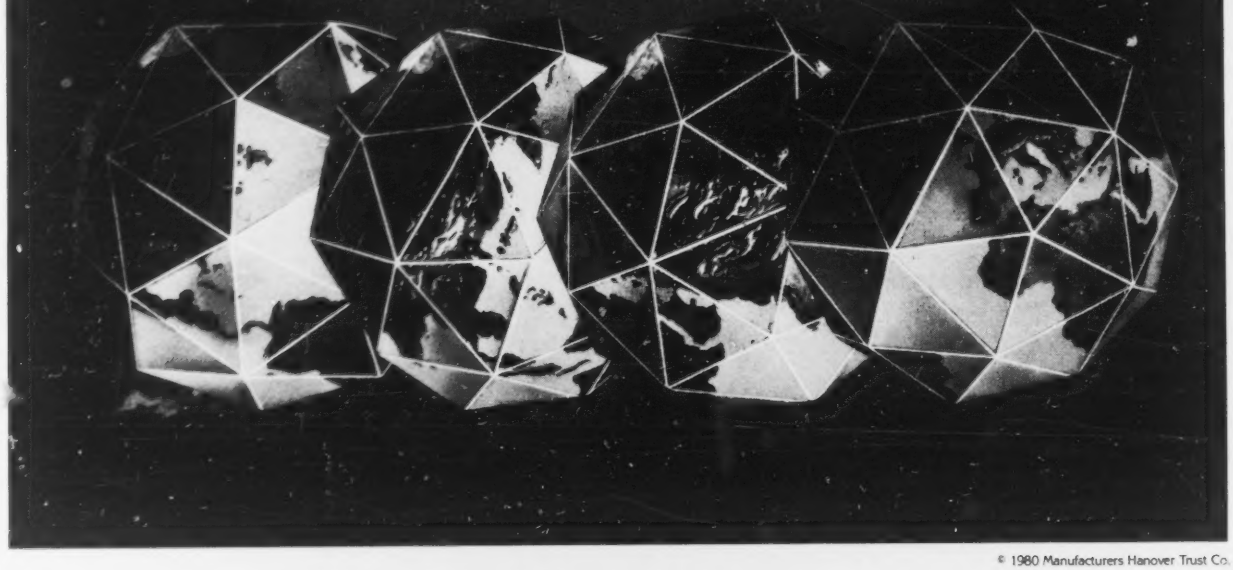

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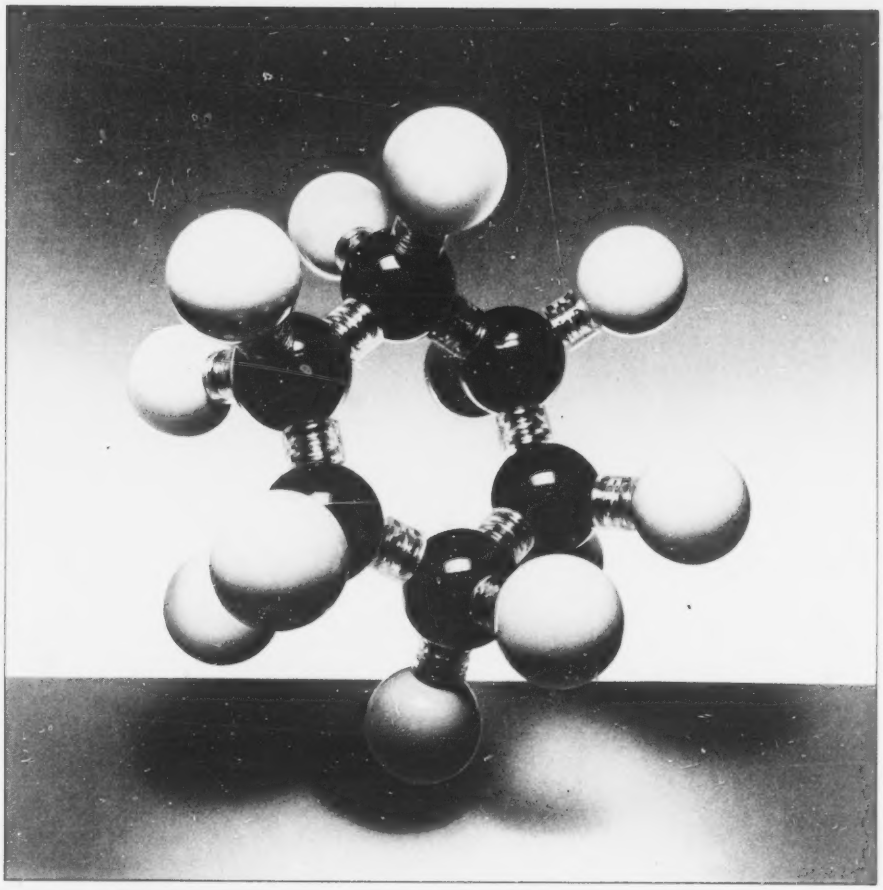

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The View from Bonn

by Dr. Helmut Schlesinger
Vice President,
Deutsche Bundesbank

Monetary stability and inflation control have traditionally been accorded high priority in the Federal Republic of Germany. Following the shock experience of two hyperinflations within a generation, which led to currency reforms in 1923 and 1948, banking and currency legislation in Germany after World War II took particular care to contain the dangers of disruptive inflation, prevent the concomitant erosion of the purchasing power of money, and preserve the real value of private savings. The Central Bank Act of 1957 thus assigned to the Deutsche Bundesbank the task of controlling the money stock and total credit supply with the ultimate aim of "safeguarding the currency." Under the Act, the central bank is obliged to support the Government's general economic policy. However, in complying with this general requirement, the Bundesbank is not permitted to neglect monetary stability as its specific goal in favor of growth and full employment targets; moreover, it is independent of instructions from the Government in performing its primary function, i.e., to act as a "guardian of the currency."

The high degree of independence given to the Bundesbank, its apparent predilection for price and monetary stability, and the wide measure of support its policies received by the German public were often attributed to Germany's traumatic inflation experience and were rarely fully understood by outside observers up to the recent past. In many other countries, notably those committed to post-Keynesian growth and income stabilization policies, "creeping inflation" was more or less accepted as the inevitable consequence of employment-creating demand management policies. According to this strand of thought, monetary management used to be regarded as a mere adjunct of expansionary budget policies, and central banks were generally expected to maintain a fairly accommodating stance in order to prevent the emergence of serious unemployment.

"... the Bundesbank is not permitted to neglect monetary stability as its specific goal in favor of growth and full employment targets ..."

However, with inflation accelerating rapidly and monetary disorder leading to currency and exchange rate disturbances in the Seventies, traditional demand

management policies and the ensuing neglect of monetary stability tended to produce anti-social consequences: Inflation, which was increasingly recognized as a source of social discomfort and unrest, could neither guarantee steady economic growth nor the maintenance of full employment conditions. As a result, at the international level, there was a gradual reorientation toward a position which Germany had never abandoned. Economic summit conferences as well as individual governments of the major industrial countries were increasingly ready to accord highest priority to the fight against inflation, with the latter no longer being regarded as a social "pacifier," but rather as a major source of unemployment and weak growth performance.

Hence after the outbreak of the second oil crisis in 1979, a high degree of consensus seems to have developed that the difficulties caused by the higher cost and short supply of crude oil could not be overcome if a new round of uncontrolled world-wide inflation was allowed to take its course. Policy makers in major industrial countries rather see a need for permitting the higher price of oil to work its way through the economy in an orderly way.

The ensuing price signals should facilitate energy saving and substitution, and the resulting drag on real incomes will help create the necessary room for an increasing transfer of real resources to oil-producing countries. Thus, determined and coordinated stabilization efforts, including the maintenance of tight monetary reins, are increasingly regarded as an indispensable prerequisite for bringing about the necessary painful adjustments.

Germany's current account trends
in billions of dollars

	1970-73 (average)	1974	1975-78 (average)	1979	1980 (forecast)
Trade balance (FOB-CIF)	7.1	20.2	17.2	13.8	8.0
Energy	—2.7	—10.2	—13.1	—25.2	—35.0
Manufactures	18.7	42.5	45.4	59.1	65.0
Food, raw materials, other	—8.9	—12.1	—15.1	—20.2	—22.0
Trade balance (FOB-FOB)	9.1	22.2	19.9	17.7	13.5
Invisibles	—7.3	—11.9	—14.7	—23.2	—28.5
Tourism	—2.6	—4.8	—7.1	—12.2	—13.3
Other services	—0.7	—0.9	0.1	0.4	—2.3
Transfers	—4.0	—6.2	—7.7	—11.4	—13.0
Current account balance	1.8	10.3	5.2	—5.5	—15.0

Since the mid-Seventies, the Bundesbank's stabilization policy has been guided by intermediate targets for the growth of the money stock. Starting in late 1974, the Bundesbank has kept up the practice of publishing a monetary target for the coming calendar year in advance. The monetary authorities decided with the full support of the Federal Government to publish monetary growth targets indicating the limits of monetary accommodation of projected demand, cost and price developments.

"However, the direct contribution which monetary management can make to control the inflation process should not be overestimated."

This served to restore a high degree of consensus on the necessity of anti-inflationary policies, facilitated coordination among the social partners and the various sectors of economic policy, and strengthened the sense of responsibility of those directly involved in wage-bargaining and price-setting decisions. Today, virtually all major central banks follow similar procedures. It must, of course, be admitted that specific circumstances—a high degree of socio-political coherence and a remarkable sense of responsibility on the part of German trade unions—have provided a favorable background for such a policy approach in the Federal Republic.

However, the direct contribution which monetary management can make to control the inflation process should not be overestimated. The Bundesbank is fully aware of the limitations of corrective monetary measures and would hesitate to accept the proposition—put forward by a radical school of thought—that the central bank is always able to effectively control the main sources of inflation. Monetary policy is not so powerful that other measures designed to combat non-monetary causes of inflation could be dispensed with. Thus monetary policy in Germany has hardly any noticeable impact on public sector expenditures and comparatively little on private consumption. Wage and price increases are not exclusively generated by excess demand conditions which can be remedied by global means of a restrictive monetary policy, but are, at times, also the outcome of market power exercised by suppliers in domestic and international markets.

The renewed disruptive rise in crude oil prices in 1979/80 underlines this point. The Bundesbank, therefore, cannot relieve the government, management and labor of any responsibility. In respecting the autonomy of the social partners and the decisions reached by parliament, the Bank must essentially confine itself to establishing an intelligible monetary framework for desired medium-term economic developments. However, in doing this it hardly sees itself in a position to determine the extent to which this margin is used for financing real or only nominal growth.

Money-supply guided stabilization policies obviously depend for their credibility on the central bank actually having the money stock completely under control. In Germany, as a largely open economy with fully liberalized capital markets, international monetary linkages have tended to limit the effectiveness of monetary management. However, transition to floating in 1973 enabled Germany to insulate itself to some extent from international inflation trends and ward off speculative capital inflows which had severely constrained the Bundesbank's ability to pursue tight monetary objectives. The German inflation rate could thus be lowered progressively from 7% to 2½% between 1974 and 1978.

However, with wide differences in the levels of economic activity, interest and inflation rates in the leading industrial countries re-emerging in 1977/78 and the German recovery not safely under way, the authorities in 1978 tolerated a pronounced overshooting—by 3½ percentage points—of the annual monetary target. The main reason was that, under domestic considerations, the Bundesbank felt obliged to hold out against an excessive appreciation of the Deutsche mark by keeping official lending rates at historically low levels. Furthermore, the world economic summit of mid-1978 urged the Federal Republic to assume "locomotive" functions by adding a substantial reflationary fiscal policy package. The economy subsequently moved into a strong investment-led recovery and had to absorb the new oil price shock emerging in early 1979 with domestically generated inflation increasing and the money stock growing at two-figure monthly rates.

In order to prevent a sharp re-acceleration of inflation and not to facilitate an excessive passing on of higher oil prices, the Bundesbank announced comparatively tight monetary targets for 1979 (6-9 percent) and 1980 (5-8 percent). At the same time, the

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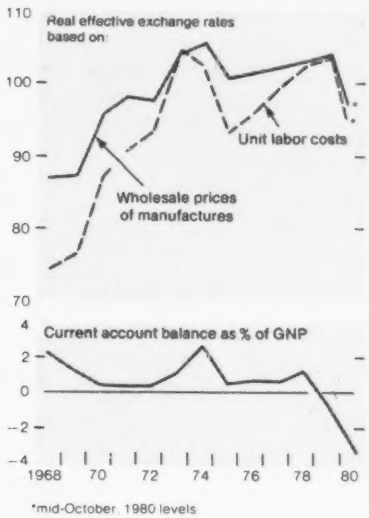
Exchange rates and balance of payments



*mid-October, 1980 levels

authorities indicated that they were firmly resolved to meet the monetary objectives announced in late 1978 and 1979 respectively. They also made it clear that they were willing to influence monetary growth toward the lower end of the target ranges. In order to bring about the slowing-down of monetary growth implied by these objectives, the Bundesbank progressively tightened its policy between early 1979 and the spring of 1980.

Monetary restrictions were not hampered by external constraints—except during short periods—although Germany entered into new exchange rate commitments when the European Monetary System became effective in March 1979. This is mainly because Germany's external position has changed fundamentally since 1978. Following the 1979 oil shock, the current account of the balance of payments moved into deficit (1979: DM 10 billion; 1980: DM 25 billion, according to recent estimates), and the weakening of the current account is unlikely to be quickly reversed.

In the summer of 1980, monetary policy had at least partially achieved its short-run stabilization objectives. Following a reduction of monetary growth to just above 6 percent in the final quarter of 1979, the money stock tended to expand close to the lower end of the 1980 target range since about mid-year. Consumer prices reached a peak at a 6 percent year-on-year rate in May/June, and domestically generated inflation—outside the building industry—showed first signs of cooling off. Even more important, wage increases in 1979/80 were not fully adjusted to the rise in oil prices—as

"... there is, at present, no conflict between domestic and external stabilization objectives."

they had been in 1974—and a renewed strengthening of inflation mentality which threatened to emerge in early 1979 could be dampened successfully.

On the external front, short-run policy objectives came within reach already in the early summer months: The Deutsche mark recovered, notably against the U.S. dollar, and after sharp capital outflows at the beginning of 1980 the current-account deficit was since May 1980 entirely financed through the market by means of capital imports. However, for an advanced industrial country, which should be expected to effect a real transfer of resources to the rest of the world, this can only be regarded as an interim stage. In the longer run, monetary management has also to contribute to reducing the excessive current-account imbalance. Hence—unlike the situation in the past—there is, at present, no conflict between domestic and external stabilization objectives. Given Germany's past inflation record and the short-run achievements of monetary management in 1979 and 1980, it should be possible to maintain high stability standards which in turn are the most effective means for promoting a satisfactory medium-term growth performance. ■

DEUTSCHE ZUSAMMENFASSUNG

In den Mittelpunkt seiner Betrachtung stellt der Verfasser die Moeglichkeiten der Deutschen Bundesbank, in den Bereichen Geldpolitik und Inflationskontrolle als Waehrungshueter taetig zu werden. Er beschreibt im einzelnen die Anstrengungen, die die Bundesbank in den letzten Jahren unternommen hat, um in hohem Masse zu Stabilitaet und Wachstum in der Bundesrepublik beizutragen. Dabei geht er von dem besonderen Stellenwert aus, der in Deutschland der Geldwertstabilitaet seit den Waehrungsreformen von 1923 und 1948 beigemessen wird. Er beleuchtet besonders die Aktionen und Reaktionen, die seitens der Bundesbank, insbesondere Mitte der siebziger Jahre, wiederholt notwendig waren, um den Geldmarkt der Bundesrepublik angesichts der vielfachen und sehr engen Interdependenzen zu den Geldmaerkten des Auslands mit ihren nicht immer stabilitaetsfoerdernden Einfluessen vor importierten Inflationsschueben zu bewahren. Insgesamt kommt er zu dem Schluss, dass es angesichts der erfolgreichen Inflationsbekaempfung der vergangenen Jahre und der Stabilitaetserfolge auch noch seit 1978 durchaus moeglich sein sollte, auch mittelfristig noch ein zufriedenstellendes Wachstum zu erreichen.

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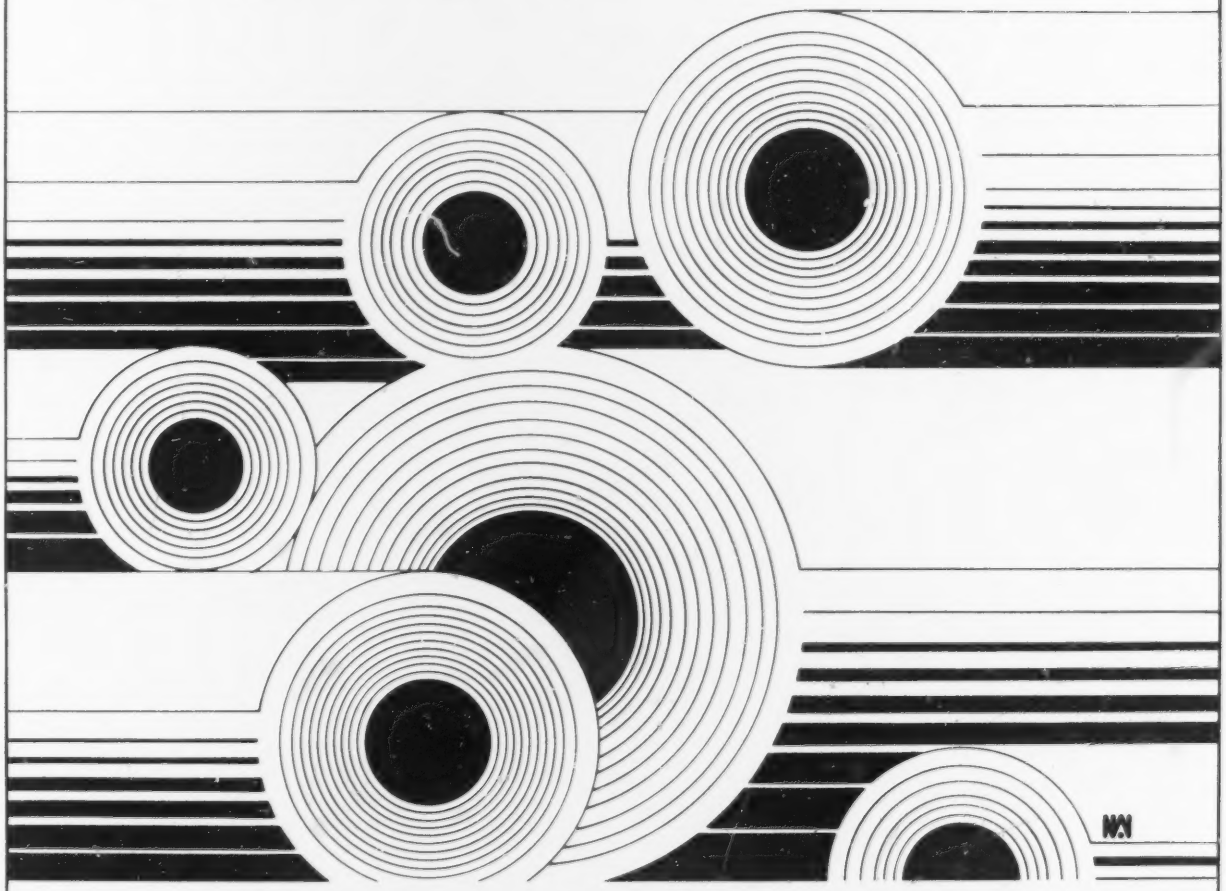

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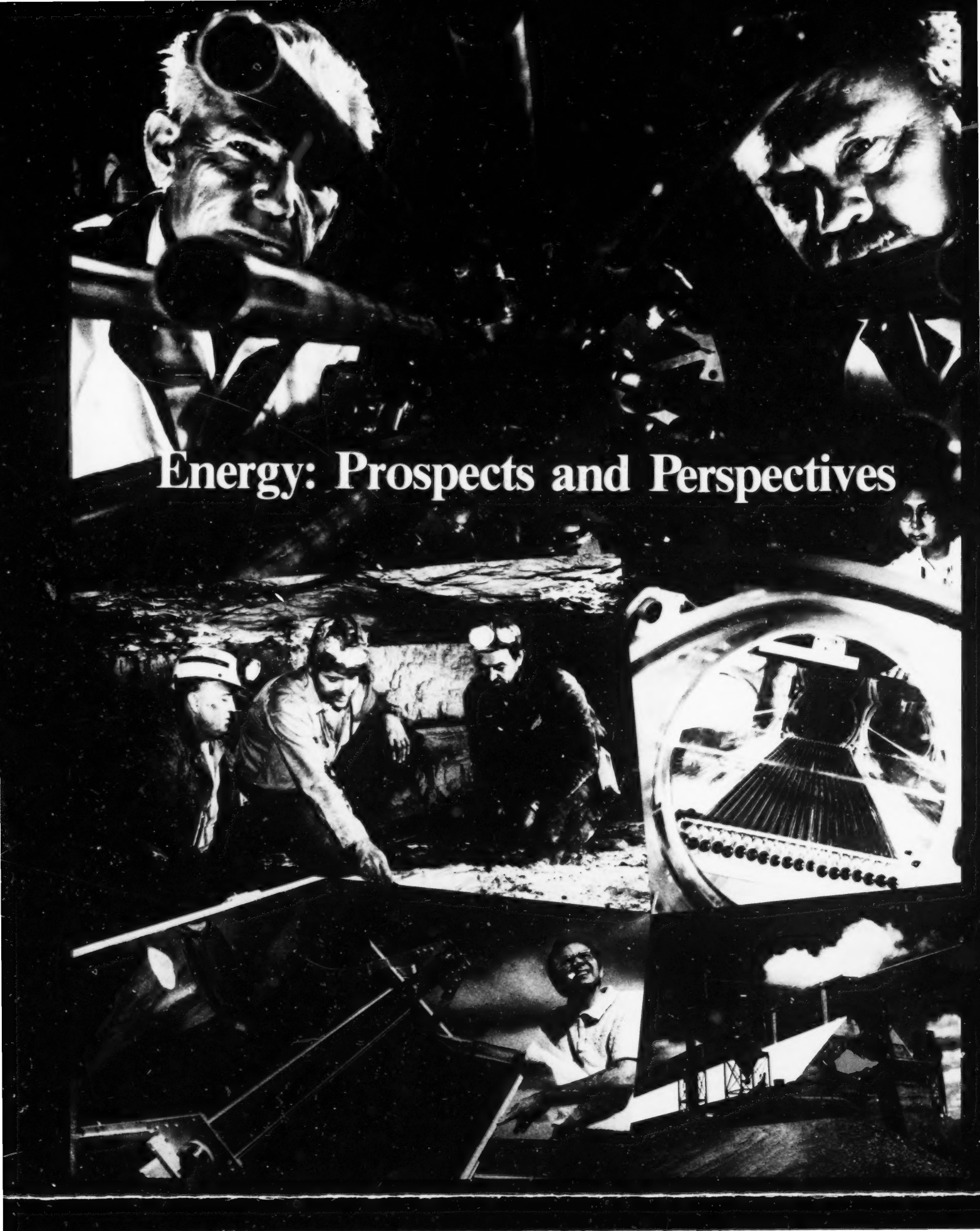


Energy: Prospects and Perspectives

The Future for Germany's Coal

by Dr. Karlheinz Bund
Chairman,
Ruhrkohle AG

"Coal—The Bridge to the Future"—under this impressive title an international team of experts, led by Professor Carroll Wilson of the Massachusetts Institute of Technology (MIT), recently published a study on the role coal is to play throughout the world, as we make our way into the post-oil era. The major conclusions:

- The coal reserves that could be recovered economically are many times greater than the known oil and gas deposits.
- In the past two decades oil covered two-thirds of the additional energy requirements, while coal hardly contributed to the expansion at all. Even if the world's energy needs rise only moderately, coal must cover two-thirds of the added demand until the year 2000.
- To meet the energy supply of the OECD region in the year 2000, coal consumption could exceed total oil use.

To reach this level, world coal production must be increased 2½ to 3 times and reach a level of up to 7 billion metric tons t.c.e.; the world coal trade will expand four to five times in volume from 800 million to one billion metric tons by the year 2000.

These figures suffice to show that enormous efforts are required to realize coal's anticipated contribution. The renaissance of coal is not ordained by the laws of nature. To be euphoric would be erroneous. Coal can only realize its potential in meeting the need if the necessary political and business decisions on energy policy are taken right now without hesitation. Investments in mining require a long lead-time. The risk is great. How much coal will be available in the Nineties is being decided today. To build and expand the international channels of supply requires billions in investments.

In Germany, too, energy policy anticipates a growing supply from the domestic bituminous coal industry. In 1979, domestic bituminous coal consumption totaled nearly 76 million metric tons t.c.e. It also marked the first time since the end of the Fifties that domestic production could be increased, reaching more than 87 million metric tons t.c.e. This output plus sales from stockpiles covered a positive balance in the

"... energy policy anticipates a growing supply from the domestic bituminous coal industry."

coal trade of 20 million metric tons t.c.e.

Accordingly, bituminous coal was—and this is often overlooked—the second most important energy source. Already today, it plays an important role in supplying the domestic energy market.

A high degree of reliability in the supply of electric utilities is assured under long-term contracts. (Today, coal fuels about 54% of the electric energy produced. Domestic coal accounts for about 25%, lignite also approximately 25%.) The German bituminous coal industry provides domestic steel producers with a complete resource for coal and coke, also assured under long-term arrangements. The stockpiling program has been established with the aim of being prepared for any crises and to cover an expansion of demand, if possible without disruption.

We estimate that the market potential for bituminous coal in the Federal Republic will total 130 to 140 million metric tons t.c.e. in the year 2000. Future markets for bituminous coal—markets with a growing need for bituminous coal—will be electric utilities and heating generally. To cover the larger requirements, German mining can make a growing contribution.

Under the long-term supply contracts, the amount of domestic bituminous coal to be supplied to electric generating plants will increase up to 50 million tons t.c.e. by 1995.

As a fuel for heating, coal faces its major challenge. In replacing oil, it has a large potential. To fill this need, the market for bituminous coal could increase by 40 to 50 million metric tons. Accordingly, the German coal industry is heavily involved in the development of modern coal application and conversion technology. The mining companies are expected to participate extensively in large-scale plants. This involvement represents a significant contribution not only to the efforts to assure the fuel supply but also to the energy market specifically and the economy generally.

Domestic bituminous coal can cover up to 90 million metric tons t.c.e. of the estimated need for 130 to 140 million metric tons. To that end production will have a total of about 100 million metric tons, possibly more. The difference between production and domestic sales will be needed for exports, in particular to supply the steel industry in the countries of the European Community outside of Germany.

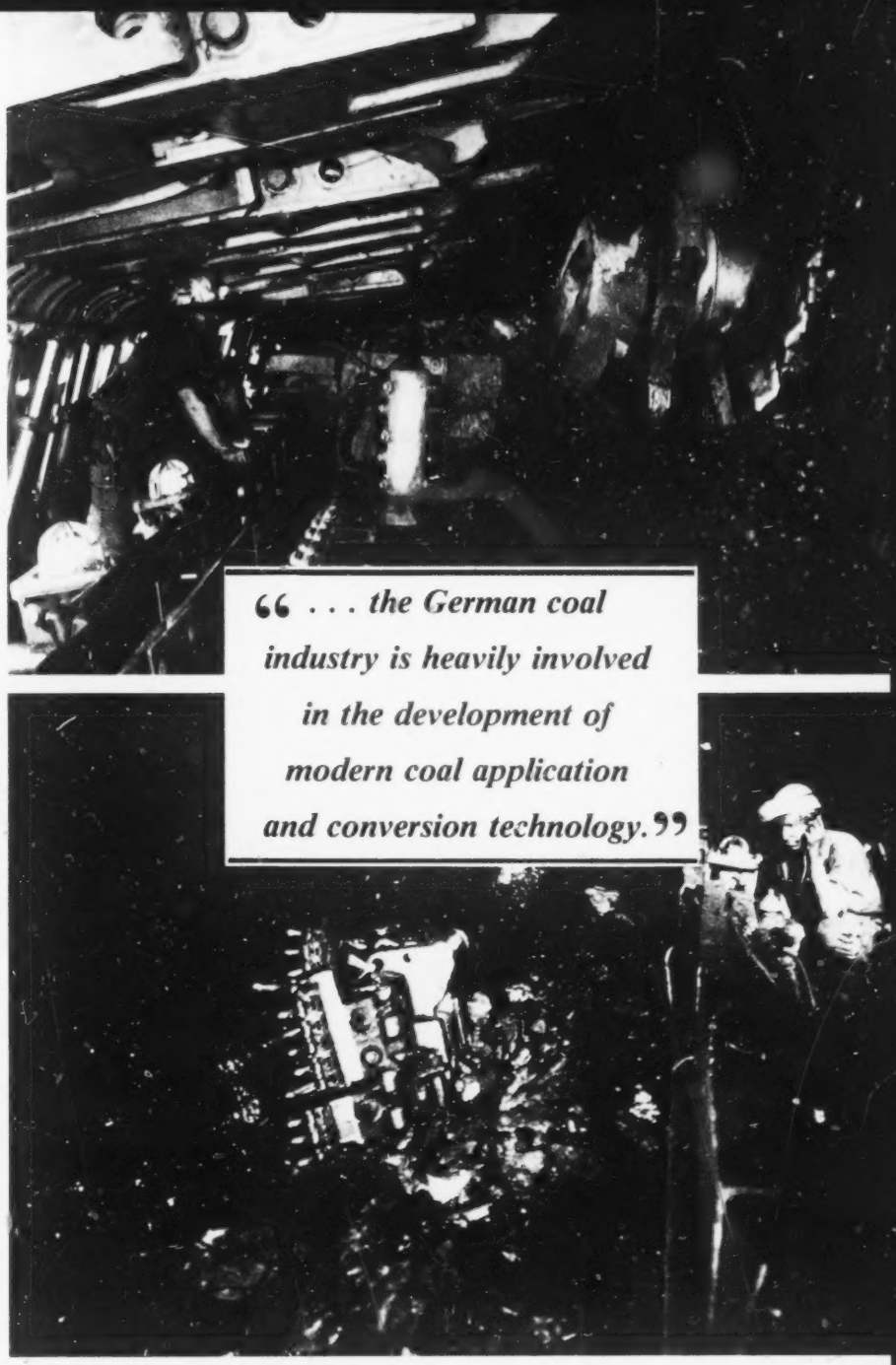
The road to achievement

No particular difficulties are expected to be encountered in the following areas:

Reserves: The Federal Republic possesses 24 billion metric tons in economically recoverable bituminous coal reserves. It will suffice for many generations to come.

Technology: The comprehensive streamlining measures sponsored jointly by public energy policies and the mining industry have made Germany's mines highly efficient. No country—laboring under comparable geological conditions—can equal its productivity.

Personnel: On the basis of a productivity increase of only 1% per year and no expansion of the labor force, an output of



"... the German coal industry is heavily involved in the development of modern coal application and conversion technology."

Energy Market

Consumption of primary energy Federal Republic of Germany	1979* m.t. coal equiv-alent	1979* %	1978 m.t. coal equiv-alent	1978 %
Hard coal	75.8	18.6	69.2	17.8
Brown coal	38.1	9.3	35.9	9.2
Mineral oil	206.8	50.7	203.3	52.3
Natural gas	65.3	16.0	59.8	15.4
Nuclear energy	13.9	3.4	11.8	3.0
Water power	5.8	1.4	6.6	1.7
Miscellaneous	2.4	0.6	2.4	0.6
Total	408.1	100.0	389.0	100.0

Generation of electric power Federal Republic of Germany		1979*	1978
Total	TWh	372.7	353.4
by fuel	%		
Hard coal		29	28.7
Brown coal		25	25.5
Mineral oil		8	9.8
Natural gas		18	18.3
Nuclear energy		11	10.2
Water power		5	5.2
Miscellaneous		4	3.3

Iron and Steel Industry Federal Republic of Germany		1979*	1978
Raw steel production	m.t.	46.0	41.3
Pig iron production	m.t.	35.2	30.1
Coke rate (kg of coke per t of pig iron)		497	486

*provisional figures

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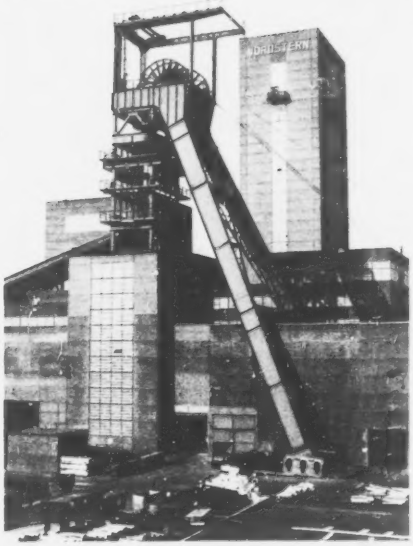


> ***"The world's coal market also has to contribute more to the energy supply of the Federal Republic."***

decidedly more than 100 million metric tons t.c.e. could be reached by the year 2000.

Important prerequisites are, however:

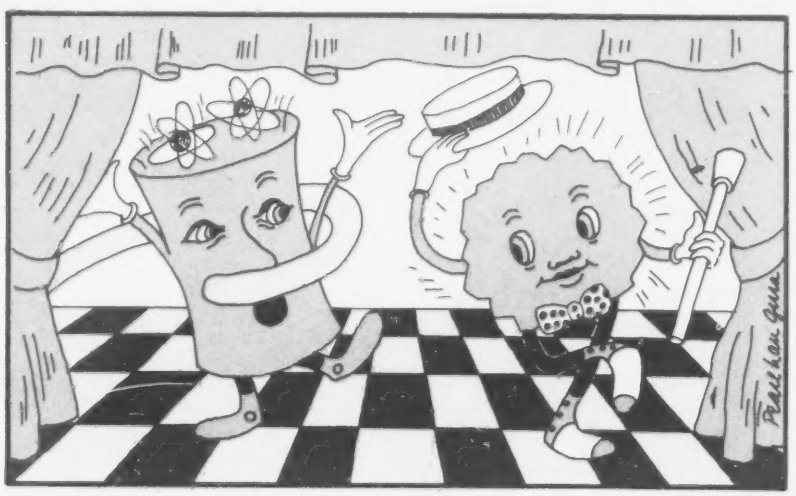
- An exploration and investment program to determine the optimum exploitation of domestic deposits.
- Long-term contracts or similar arrangements in order to assure a price covering the cost of the contracted volume. Such contracts have until now only been concluded with electric utilities. They are also a prerequisite for other markets. Coal mining requires such arrangements in order to undertake the required long-term investment programs.

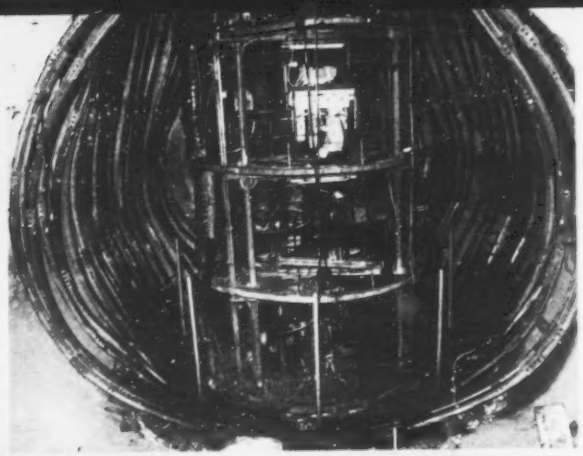
The world's coal market also has to contribute more to the energy supply of the Federal Republic. To achieve an even greater security of supply, it would make sense to acquire, in addition to long-term supply contracts, participations in foreign deposits and mines. Also to be considered are measures ranging from the export of modern technologies for the application and conversion of coal to the construction of modern conversion plants on top of foreign deposits in exchange for the supply of converted products. German mining will take an active part in these opportunities.

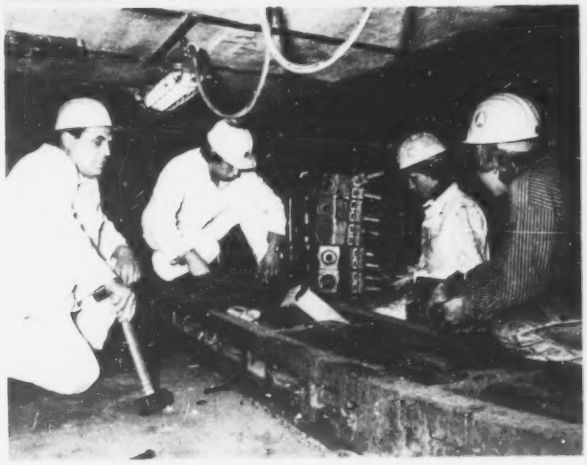
The strategy for the future of German mining points in three directions:

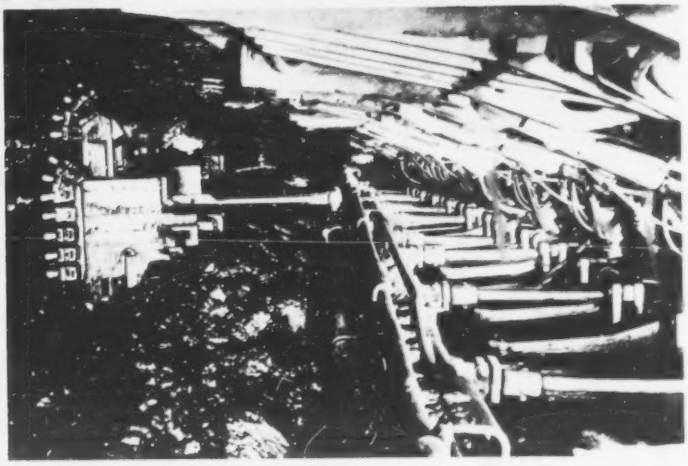
- Full utilization of capacities followed by an increase of domestic output.
- Involvement in the world's coal trade, and
- Participation in large-scale coal conversion plants at home and abroad.

In the future, mining will have to cope increasingly with the challenges posed by international coal and energy policies if it is to contribute to the German energy supply in a measure equal to its potential and the expectations of energy policies. ■









DEUTSCHE ZUSAMMENFASSUNG

Der Artikel befasst sich mit der hervorragenden Rolle, die die Kohle bei der Deckung des Energiebedarfs bis zum Jahre 2000 spielen wird und muss. In den letzten zwanzig Jahren wurden zwei Drittel des Bedarfszuwachses im Energiebereich durch Oel gedeckt. Den kommenden Bedarfszuwachs bis zum Jahre 20[illegible] muss zu zwei Drittel die Kohle decken. Dazu muss die Weltkohleproduktion auf[illegible]ben Milliarden Tonnen im Jahr verd[illegible] werden. Die notwendigen Inv[illegible]tscheidungen auf wirtschaftliche[illegible]litischer Ebene muessen jetzt getro[illegible]n, denn heute wird ueber die Kohleproduktion der neunziger Jahre entschieden; Bergbauinvestitionen sind kapitalintensiv und zeitaufwendig.

1979 stieg der Kohleverbrauch in der Bundesrepublik Deutschland zum ersten Mal seit den fuenfziger Jahren wieder an, auf 76 Millionen Tonnen. Die Kohlefoerderung stieg auf 87 Millionen Tonnen. Hinzu kamen Verkaeufe in Hoehe von 20 Millionen Tonnen aus vorhandenen Kohlevorraeten. Steinkohle war nach Oel die wichtigste Primaerenergiequelle. Damit ist die Elektrizitaetsversorgung in der Bundesrepublik z. Zt. gesichert, ebenso wie der Brennstoff fuer die inlaendische Stahlindustrie.

Darueber hinaus ist mit dem Aufbau einer gezielten Kohlelagerwirtschaft zur Vorsorge in Krisenfaellen begonnen worden. Auch die Befriedigung der wachsenden Energienachfrage muss sichergestellt sein. Wachsende Nachfrage wird sich insbesondere in den Bereichen Stromversorgung und Heizung ergeben. Diesen Anforderungen kann die deutsche Kohle gerecht werden. Vorhandene Kohlevorraete von 24 Milliarden Tonnen sind gesichert. Der deutsche Kohlebedarf im Jahre 2000 wird auf 130 bis 140 Millionen Tonnen jaehrlich geschaetzt. Circa 100 Millionen Jahrestonnen koennen dabei aus eigener Foerderung erbracht werden. Die technischen Moeglichkeiten hierzu sind in Zusammenarbeit von Regierung und Wirtschaft erarbeitet worden und werden weiter entwickelt; der Personalbedarf kann ohne zusaetzliche Arbeitskraefte gedeckt werden, wenn die Produktivitaet nur um 1% jaehrlich waechst.

Voraussetzung fuer die Leistungssteigerung der inlaendischen Kohle ist die Erarbeitung eines Explorations-und Investitionsprogrammes zur optimalen Nutzung der inlaendischen Lagerstaetten. Des weiteren muessen langfristige Liefervertraege oder gleichwertige Regelungen getroffen werden, um kostendeckende Preise zu erzielen. Diese vertraglichen Regelungen braucht die Bergbauindustrie, um die erforderlichen langfristigen Investitionsprogramme durchfuehren zu koennen.

Dareuber hinaus wird der Weltkohlehandel einen wachsenden Beitrag zur Energieversorgung der Bundesrepublik Deutschland leisten muessen. Um auch hier die Versorgung sicherzustellen, ist die deutsche Beteiligung an auslaendischen Bergbauvorhaben und die Errichtung moderner Kohleveredelungsanlagen, errichtet ueber auslaendischen Gruben, im Tausch fuer veredelte Produkte notwendig. Die Strategie fuer die deutsche Kohleindustrie schliesslich zeigt in drei Richtungen:

- *Volle Nutzung der eigenen Kapazitaeten und eine Erhoehung der heimischen Foerderung;*
- *Aktive Beteiligung am Weltkohlehandel;*
- *Beteiligung an Grossanlagen zur Kohleveredelung zu Hause und im Ausland.*

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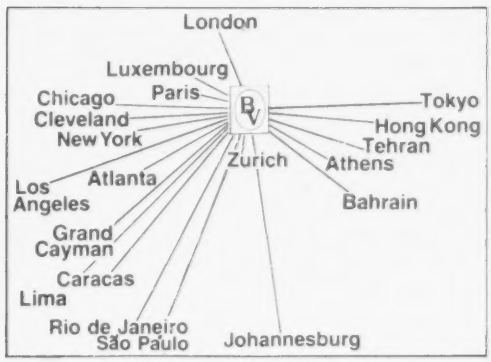

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America's Coal Must Go to Work

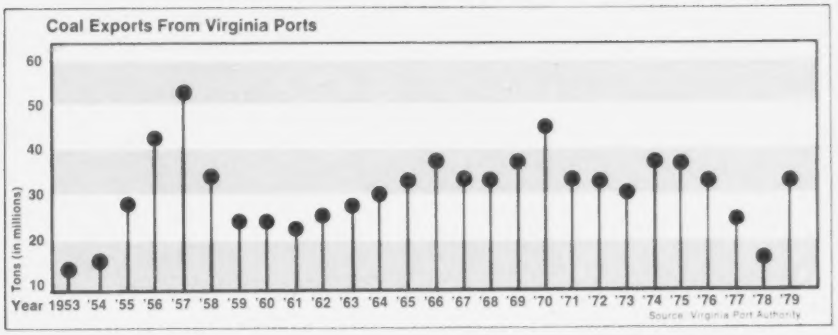
by Paul C. Merritt
Managing Editor,
Coal Age

America is one of the few, if not the only, industrialized nations in the world today that does not have an energy crisis. It never has had one. What it does have is an energy *problem.*

I say it has a problem, not a crisis, because it has a ready answer right at hand, one that could give the nation total energy independence far into the future. It is an answer that could create that independence in a short span of time, possibly 20 years or less if the nation undertakes a strong, continuing commitment to the task. As the reader has assumed by the title of this article, America's answer to its energy problem—and possibly an answer to the energy shortages of its friends—lies in its vast domestic reserves of coal.

A cliche found increasingly in speeches by politicians, economists and editors alike is the statement that America is the Saudi Arabia of coal. It certainly is. Underlying the fields and forests of America are an unimaginable 1.7 trillion tons of coal. More than 400 billion tons of that coal is potentially attainable right now—today—with the present state of sophisticated coal mining technology. At the nation's present rate of coal mining, that's enough fuel to power America well into the next millenium.

In 1979, that rate allowed American coal producers to mine more than 700 million tons of coal for the first time in the nation's history. This year the industry will top 800 million tons. That's a lot of coal in anyone's language, and it's why America ranks at the


Coal Exports From Virginia Ports
Tons (in millions)
60
50
40
30
20
10
Year 1953 '54 '55 '56 '57 '58 '59 '60 '61 '62 '63 '64 '65 '66 '67 '68 '69 '70 '71 '72 '73 '74 '75 '76 '77 '78 '79
Source: Virginia Port Authority

top of the list of the world's coal producers. Thus, to an outsider it might seem that America must have a solid, coal-based energy industry firing its economy. Unfortunately that is only partly so.

Oddly, with so much coal in the ground available for America's energy needs, and so much being mined every year, coal accounts for a paltry 19% of the nation's total energy output. On the other hand, petroleum and natural gas (both domestic and imported) account for about 75% of the output. This tremendous imbalance becomes all the harder to comprehend when one learns that coal constitutes a full 88% of America's total fossil fuel reserves as measured by heat-producing capability.

(Let it be noted here that if there is any one bright spot for coal in the present energy mix of the United States, it is that 48% of total electricity generated in 1979 came from coal-fired plants. By far, electric generation is the dominant use for coal in the nation, consuming as much as 75% of annual mined output. The remaining 25% of coal production is divided between metallurgical coal for steel coke plants, industrial uses, and exports.)

Coal's limited contribution to America's overall energy requirements hasn't budged much from its under-20% figure for the past two decades and it doesn't appear that it will do so in the immediate future—at least not dramatically. It seems increasingly strange to growing numbers of Americans that given the capabilities of the world's oil-producing cartel to harm, if not destroy, any and all national economies of the western world through arbitrary and capricious pricing and production policies; the cartel's ability to politically blackmail those nations dependent on its oil supplies; the continuing decline of the United States' reserves of petroleum and natural gas; and the high prices and burgeoning unemployment lines throughout the land due to domestic inflation and recession, both fired by the oil prices of the cartel, the politicians in Washington seem so reluctant, so slow, in turning this nation to its own indigenous, plentiful, politically safe bastions of coal.

Yes, a growing number of Americans may be wondering about this but there isn't really much that has to be understood. All that is required is the awareness that, in America anyway, coal and the environment are two subjects so intertwined as now to be virtually inseparable. This is true whether coal is discussed on a political level, an economic level, or at a cocktail party. It is a legacy of the 1970s, when environmental concerns became a vote-getting, politically-safe "me-tooism" for all politicians, and when numerous environmental protective groups proliferated around the nation.

A result of this movement was the passage of strict environment protection laws and the subsequent creation of vast, ubiquitous environmentally-oriented bureaucracies in the federal and state governments. Their powers are mighty, for these organizations can stop a producing mine from producing, a developing mine from developing, and a generating plant from producing electricity whenever they believe that the environment is being illegally harmed.

While there are many good arguments for regulating coal mining operations in the United States and for controlling emissions from plants into the air, there is no argument that such controls are hindering America's switch from oil to coal. And in effect it is the American government which is doing the hindering for that is where the controls emanate from.

"Whether belonging to the federal government or to private land owners, coal resources in the western states are vital to the United States."

Government's restraining role

These controlling regulations from Washington are myriad and all-encompassing. (The American coal industry has the dubious distinction of being the most

controlled industry in the nation. Outside the military, of course.) Charged with the task of enforcing the rules on mining and burning of coal are two key federal agencies, the Environmental Protection Agency (EPA) and the Office of Surface Mining (OSM—pronounce it "Awesome"). The EPA tells consumers of coal just under what specific conditions they can use coal. The quality of the nation's air is its primary concern, and that means a concern about the quality (particularly the sulfur content) of coal burned. OSM, in turn, tells the coal industry under what specific conditions coal can be mined. The quality of land reclamation is its *raison d'etre*.

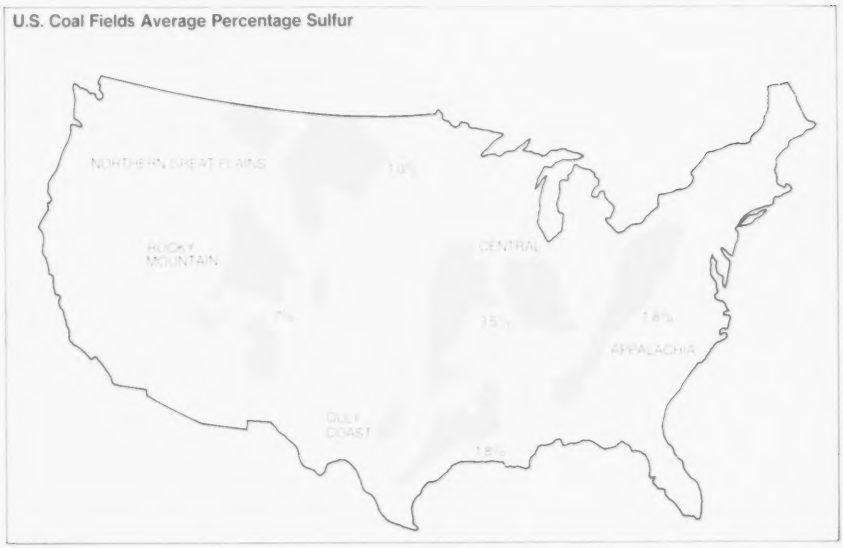
Because a mine can be shut down for failure to adequately reclaim disturbed acreage or even for inadvertent pollution of a nearby stream, and a generating plant shut down for emitting unacceptably high levels of sulfur dioxide into the air, one result has been that much of the coal we've mined we can't burn because of too high levels of sulfur. Conversely, much of the coal we can burn because of its low sulfur content we can't mine because it is too difficult or too costly to reclaim the land.

It's a quandary the mining industry has lived in for more than half a decade. But in addition to this situation, there is yet another which, if it weren't so critical to America's energy future would border on the farcical. It is Washington's ownership of huge coal reserves in the states west of the Mississippi River and its own inability or unwillingness to allow the coal to be mined. This reluctance is usually credited by federal officials to the government's insistence that such reserves be developed quickly by the leasing company and that extensive studies had to be undertaken to determine which areas could be so developed.

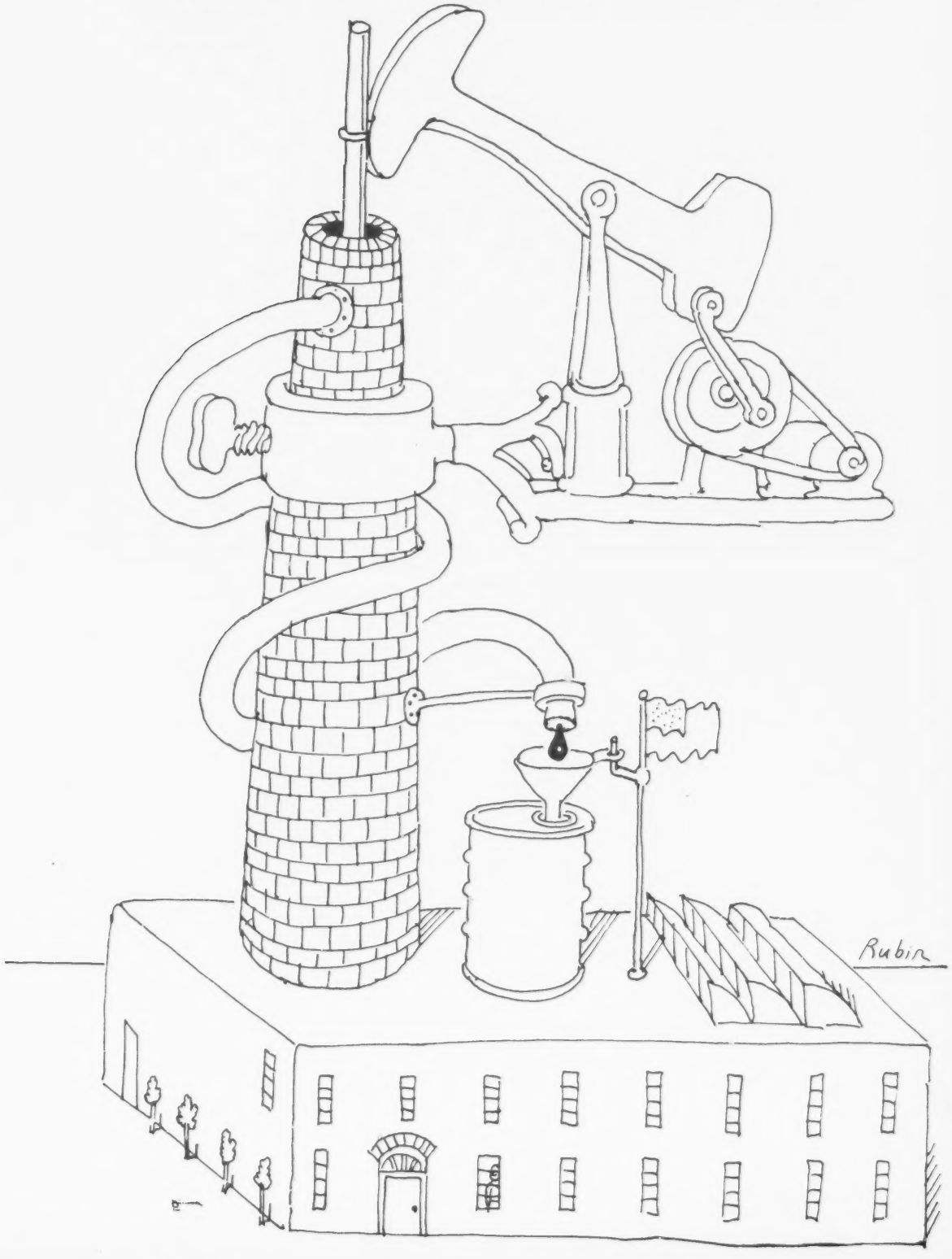
To an extent that is true, but equally true are the local political considerations over the use of the land and the use of the limited water supplies. After all, in both instances we are talking largely of ranchers and farmers, and in sheer numbers they wield much more political power in the western states than do coal producers.

Whether belonging to the federal government or to private land owners, coal resources in the western states are vital to the United States. There are several reasons for this. First, although only some 30% of today's total production in America comes from this area, total coal reserves known to exist in the West represent 55% of the entire domestic supply. (Most of this coal is owned by the federal government.)

Secondly, western coals contain very little sulfur, so little in fact (well under 1%) that most of it does not need to be cleaned to remove sulfur prior to being burned. Being of low sulfur, this coal can also be blended with the higher sulfur coals of the Midwest



Imagine a smokestack that turns heat into oil.



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You can't blame a guy for being concerned when he sees a lot of wasted energy going up a factory smokestack. Especially when he's riding in a carpool, doing his bit to conserve energy. Fortunately, though, the man is a Garrett engineer. And the sight of that smokestack is enough to start him thinking about putting all that untapped heat to work.

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If you're wondering how we can make your enterprise work harder, write our President, Jack Teske, for more information. You'll find him at The Garrett Corporation, Dept. 1, P.O. Box 92248, Los Angeles, California 90009. Or drop by. But please, remember the heat America loses. And on your way out, don't forget to close the door.

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NCA Economics Committee's 10-Year Forecast for Coal

(millions of tons)	Preliminary		Forecast		
	1979	1980	1985	1990	
Coal Production and Imports			542	625	Low
East of Mississippi	554	561	616	625	Most Likely
River			684	904	High
West of Mississippi			334	463	Low
River	216	236	356	514	Most Likely
			379	626	High
Total U.S. Production			876	1,088	Low
	770	800	972	1,250	Most Likely
			1,063	1,530	High
Coal			3	5	Low
Imports	2	2	7	10	Most Likely
			15	20	High
Total Domestic Supply			879	1,093	Low
	772	802	979	1,260	Most Likely
			1,078	1,550	High
Coke Imports			4	1	Low
Coke,	4	3	5	5	Most Likely
Actual			7	7	High
Coal			6	2	Low
Equivalent	6	4	7	7	Most Likely
			10	10	High

(millions of tons)	Preliminary		Forecast		
	1979	1980	1985	1990	
Coal Consumption and Exports			652	839	Low
Electric	528	555	733	959	Most Likely
Utilities			788	1,136	High
Domestic Coke			72	72	Low
Plants	77	75	75	75	Most Likely
			77	81	High
General Industrial			87	100	Low
and Other Steam	73	77	97	125	Most Likely
Markets			125	200	High
Synthetic Fuel Plants	—	—	—	2	Low
			—	12	Most Likely
			5	30	High
Total Domestic Consumption			811	1,013	Low
	678	707	905	1,171	Most Likely
			995	1,447	High
Exports to			18	20	Low
Canada	19	19	20	24	Most Likely
			23	30	High
Exports to			50	60	Low
Overseas	46	50	54	65	Most Likely
Markets			60	73	High
Total Exports			68	80	Low
	65	69	74	89	Most Likely
			83	103	High
Total Domestic and Export Markets			879	1,093	Low
	743	776	979	1,260	Most Likely
			1,078	1,550	High

and East to lower the overall sulfur content of those coals.

The third reason is the proximity of western coals to those areas having fast-growing energy needs, notably the southwestern states (including Texas) and the states bordering the Pacific. As indicated above, western coal also can fulfill market demands east of the Mississippi River.

Forward march—at last

Until recently, it seemed to many observers that America's commitment (and by that I mean the federal government's commitment) to coal would not get far beyond the stage of patriotic rhetoric. (Dig,

America!) Presidents Nixon, Ford and Carter, at one time or another during their respective administrations, exhorted America to turn away from its partial reliance on oil from the Organization of Petroleum Exporting Countries and to turn to energy conservation and coal as the answer to its energy needs. The mining industry responded by greatly boosting its coal-producing capacity in the period 1974-77; and the electrical utilities, knowing that precious petroleum and natural gas as boiler fuel would be short-lived (or at best a dangerous gamble), opted almost entirely to coal and nuclear power for all new plants.

What happened to the growth in coal usage after these Presidents spoke? Nothing much. After the disappearance of those lines of angry American drivers waiting for their quota of gasoline in 1974 and again in 1976 and 1977, talk about placing greater emphasis on domestic coal virtually ceased—at least among this nation's key politicians.

There exist today two ghosts of this 1970s' energy rhetoric. One is the added dependence of the United States on imports of OPEC oil, now exceeding 8 million barrels daily. The other has been the addition of at least 100 million tons of excess coal capacity that must be absorbed if the industry is to gain strength to undertake further expansion.

It's now 1980 and it's fair to ask the question "Will America opt to break the petroleum habit with its vastly larger coal resources?" The answer at last seems to be "yes"—a somewhat tentative "yes" perhaps, but a "yes" all the same. Seven and a half years after OPEC first plugged its oil-bearing pipelines to the western world, the United States government has recently taken some progressive, forward steps toward energy independence.

First, the government is accelerating its efforts to compel the conversion of utility boilers and industrial boilers from oil and natural gas to coal. To aid the utilities in this conversion, Washington has created a $10-billion, 10-year program of subsidies to underwrite a portion of the costs involved. The overall goal of this conversion is to displace at least one million barrels of oil equivalent by 1990.

Second, $20 billion has been authorized by Congress to develop commercial-size plants for manufacturing synthetic liquid and gaseous fuels from coal. Overseeing this effort is a new, quasi-independent federal agency, the U.S. Synthetic Fuel Corporation, that has broad powers to encourage the equivalent production of 500,000 barrels a day of synfuels by 1987 and 2 million barrels a day by 1992.

Third, the federal government through its Department of Energy has budgeted more than $1 billion during the 1981 fiscal year for coal research and development programs, the first time such a large amount has been appropriated for that purpose.

Fourth, the Carter Administration is making a major new push for steam (utility) coal exports. As in the United States, the OPEC-sponsored energy crisis has spawned the desire among governments in Europe and Asia to wean their respective economies away from overriding reliance on petroleum. The result has been a rapid growth of new steam coal markets for such important exporting nations as Australia, South Africa and, of course, the United States.

Historically, America has exported about 10% of its total output of coal. These exports are of metallurgical coal, used in the production of coke for steelmaking. The growth now under way in steam coal exports is therefore nothing less than spectacular—and to most of us, surprising. From zero tons in 1978, American steam coal shipments reached 2.5 million tons in 1979, and will soar to possibly 12 million tons this year. By

"Until recently, it seemed to many observers that America's commitment . . . to coal would not get far beyond the stage of patriotic rhetoric."

1990, the nation will be exporting at least 80 million tons annually, and perhaps as much as 120 million tons, to Europe and Asia.

There are a few black spots in this export

picture, however. A recent sharp increase in domestic rail transportation costs in the United States, and the inability of current railroad transportation and port infrastructures to handle the larger volumes of export coal, constitute critical factors hampering expansion of coal exports.

Aware of this situation, the federal government plans to establish a National Coal Export Task Force to assess these problems and make recommendations to overcome them. Simultaneously, port operators, railroad companies, even coal companies, are studying ways and means to resolve these difficulties in as short a period as possible so as to ensure all foreign buyers of adequate coal supplies shipped on time at the right price.

Coal's outlook is good

The future of coal in the United States may not be as rosy as some would like, but it is anything but black. Although its growth has been markedly slower than anyone expected after the first oil embargo, it appears that total consumption of coal will exceed 1 billion tons by 1990. Exports will constitute an added amount. This represents a 7% growth rate per year, substantially above that expected for the American economy as a whole. If nuclear power in the nation does not recover from The Incident at Three Mile Island, the growth rate in coal consumption will increase.

The move by America to its most plentiful fuel resource will make the oil it might earlier have imported available to other nations—OPEC willing. That development can be important to everyone. In 1979, the United States imported eight million barrels of oil daily. By 1990, imports could be down to four or five million barrels. By 2000, even less. To achieve this greater reliance on coal requires an unwavering commitment by coal producers, coal users, and most importantly, by the federal government. Hopefully that commitment is now here. ■

DEUTSCHE ZUSAMMENFASSUNG

Weil Amerika ueber ausreichende Kohlevorraete verfuegt, kennt es keine Energiekrise. Es kann allenfalls Schwierigkeiten im Energiebereich zu bewaeltigen haben. Das ist die oben erlaeuterte These des Verfassers. Der Kohleabbau und die Umstellung von Oel auf Kohle zur Herstellung von Energie wird in den USA im Laufe der naechsten Jahre stetig zunehmen. Im abgelaufenen Jahr wurden in USA 700 Millionen Tonnen Kohle gefoerdert; 1980 werden es 800 Millionen Tonnen sein. Die heute in den USA benoetigten Erdoelmengen werden eines Tages fuer andere Maerkte frei. Die Vereinigten Staaten sind das einzige Land der Welt, das durch seine bis ins naechste Jahrtausend ausreichend vorhandenen Kohlevorkommen energieautark sein kann. Bereits mit ihrer heutigen Kohlefoerderung fuehren die USA die Weltrangliste an. Bis jetzt werden erst 19% der Gesamtenergiemenge in den Vereinigten Staaten aus Kohle gewonnen. 48% der elektrischen Energie wird auf Kohlebasis erzeugt.

Um den staendigen Preiserhoehungen der erdoelexportierenden Laender und den daraus resultierenden Problemen gegenueber weniger anfaellig zu sein, muesste Kohle noch in weit staerkerem Masse zur Energieerzeugung beitragen als das heute schon der Fall ist. Das wird jedoch durch die Notwendigkeiten des Umweltschutzes sehr erschwert. Die US-Regierung hat sehr weitgehende Umweltschutzgesetze erlassen, die die Kohlefoerderung praktisch zum Erliegen bringen koennen. Dies darf aber kein Grund sein, von den Bemuehungen um eine Substitution des Oels durch Kohle Abstand zu nehmen.

Die USA besitzen grosse Kohlevorkommen westlich des Mississippi, sind aber nicht bereit oder in der Lage, diese auszubeuten, z.T. bedingt durch den starken Widerstand der dort lebenden laendlichen Bevoelkerung. Dabei ist der Abbau der dortigen leicht foerderbaren und hochwertigen Vorkommen unerlaesslich, nicht zuletzt, weil gerade der Suedwesten und auch Texas grosse Energiebedarfszuwaechse zu verzeichnen haben.

Bis vor kurzem schien es, als werde die Regierung, trotz gegebener Versprechungen, nichts an der bestehenden Lage aendern koennen. Mittlerweile werden aber erste Schritte zu verstaerktem Kohleabbau unternommen. Es werden Programme entwickelt, die fuer die naechsten zehn Jahre den Uebergang von Oel auf Kohle als Hauptenergiespender vorsehen. Ebenso werden grosse Summen zur Forschung auf dem Gebiet der synthetischen Treibstoffe bereitgestellt.

Seit kurzer Zeit exportieren die USA in steigendem Masse Dampfkesselkohle speziell nach Australien und Suedafrika. Die dabei auftretenden Transportkostenprobleme im Bereich der Infrastruktur bei Bahnen, Haefen und Schiffahrt veranlassten die Regierung, Plaene fuer eine bundesweit koordinierte Initiative (National Coal Export Task Force) zur Beseitigung der bestehenden Engpaesse entwickeln zu lassen.

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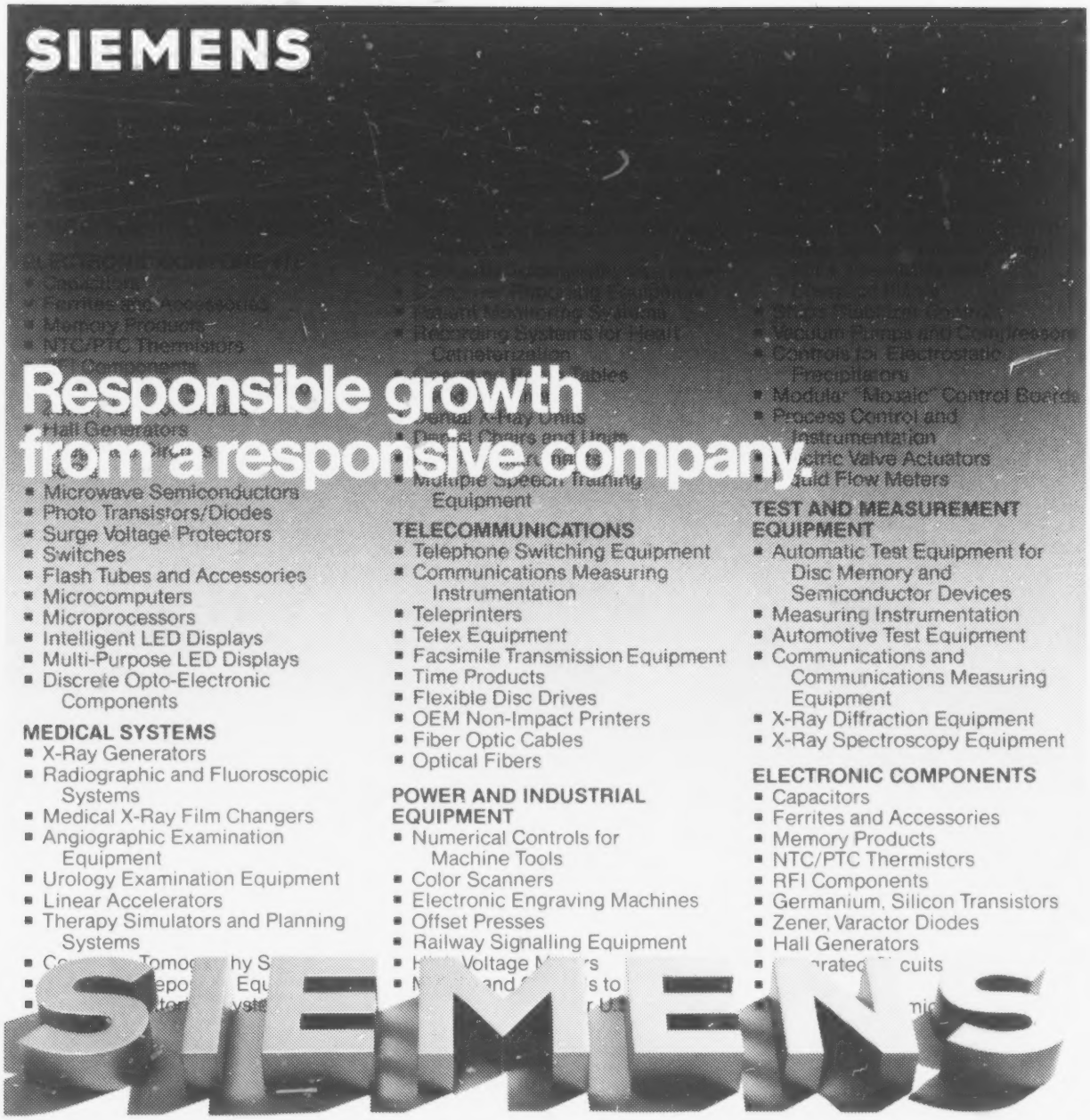

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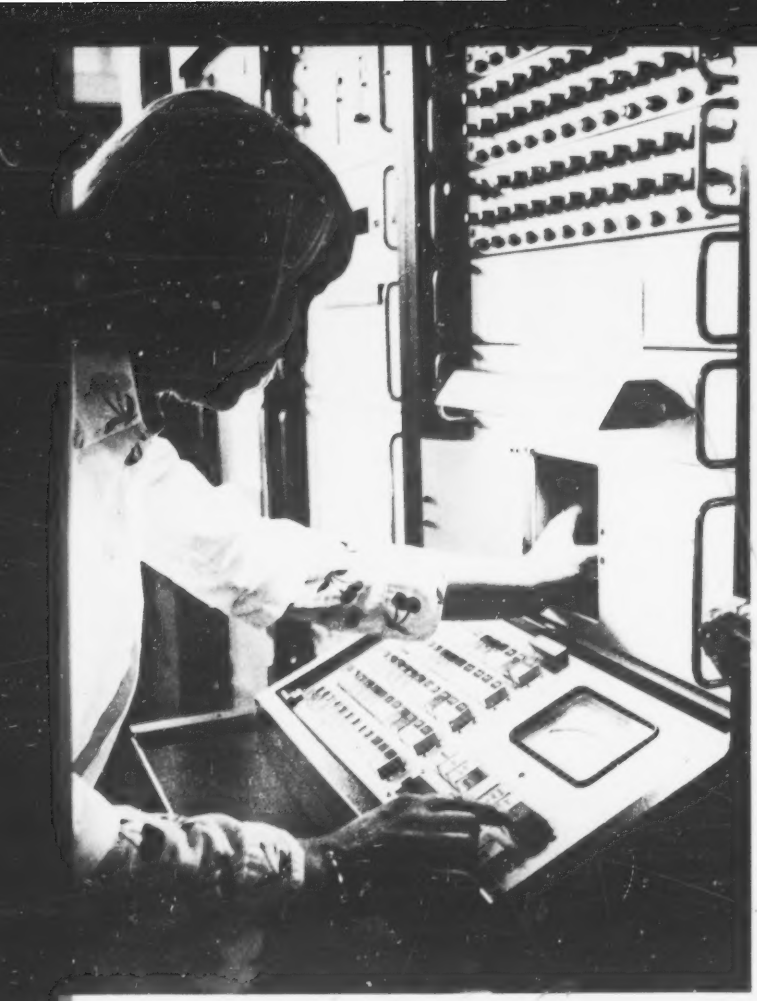
Research and Energy Supply Assurance

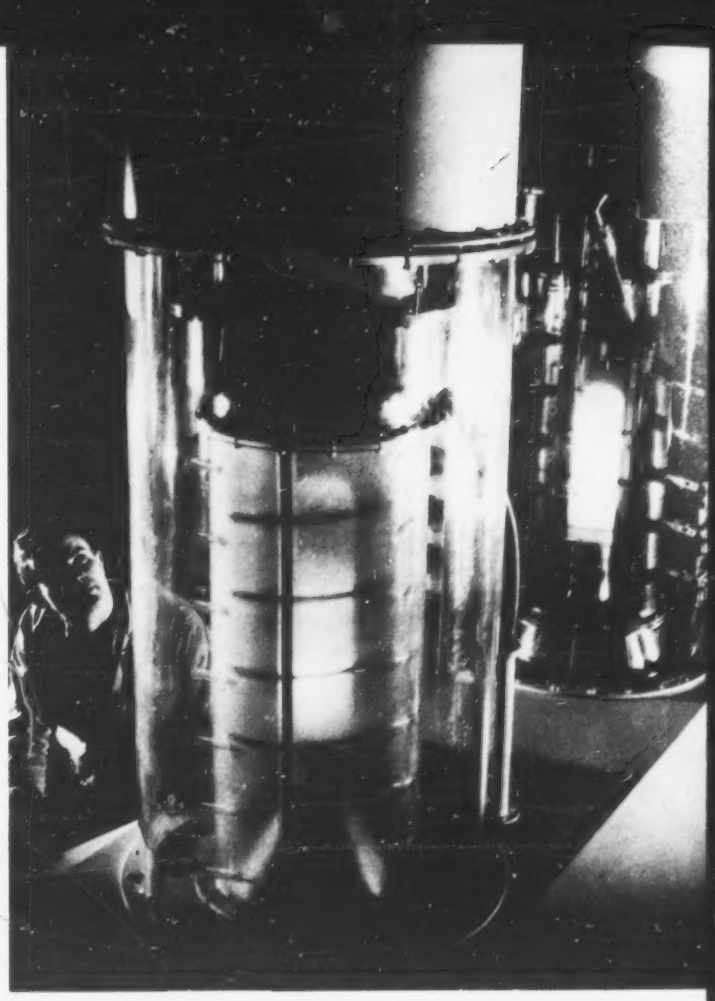
by Dr. Volker Hauff
Federal Minister of Research and Technology

The major challenge confronting the industrialized countries in the sector of energy policy during the coming decades is the task of restructuring the energy supply system.

The future development of the energy supply will be determined to a decisive extent by the following basic considerations:

- Energy policy must be planned on the basis of the realization that the structure of our present energy supply will inevitably change considerably up to the year 2000. We have sometimes failed to recognize this fact in the past.
- Energy consumption will increase throughout the world. This will be the case even if the industrialized countries should succeed in "freezing" their energy requirements to virtually the present consumption level. At the present time, this would appear to be a very ambitious goal.
- The major increase in demand on the international energy market will come from the countries of the Third World. The economic development of these countries, together with steady population growth, will bring about permanent changes in the present situation, in which some 10% of the population in the industrialized countries consume approximately 60% of the available energy supply. As far as the developing countries are concerned, securing an adequate supply of energy will become a crucial factor for their survival. We must remember that wood is the chief energy source in the Third World. Energy consumption per capita and year in the Federal Republic of Germany amounts to approximately six tons of pitcoal units. In the USA, energy consumption is double this figure. In contrast, in many of the developing countries not even one-thirtieth of this amount of energy is available. This situation must be remedied. The developing countries need energy. Indeed, the countries of the Third World are already in the middle of a major energy crisis.
- Even today, before the oil wells have run dry, serious threats to continued energy supplies must be expected. I ask myself increasingly whether the major oil-producing countries can really continue to reconcile a further increase in their production and exports with their own interests. Although it will not be easy to cut back our oil consumption, this process will have to be accelerated faster than many realize today.
- The gravity of the problem is shown by the fact that we have less and less time in which to adapt to rapidly changing circumstances. Today, sinking new coal pits or building a new coal-fired power station requires ten years' work. The construction of a major





district heating network requires more than twenty years. The same time is required for adapting the total number of old apartments to the efficient and economic use of energy. In view of those time limits, we shall be able to solve urgent energy problems only if we economize on energy and use the available supplies even more efficiently than at present. This is all the more true when we realize that, with our present energy supply system, 33% of useful energy entails a waste of 67%. This means that over two-thirds of the primary energy used is lost as "heat waste", polluting the environment, and that less than one-third is used to meet the demand. This remaining one-third, too, is finally released at a low temperature as waste heat into the environment.

"If our plans are not extended to cover longer periods of time, we can hardly expect research policy to contribute toward assurance of energy supply."

With its energy policy, and in particular with the possibilities of research policy in this field, the Federal Government is attempting to solve these problems. The measures to be taken in this sector are therefore oriented towards the following objectives:

- Medium- and long-term assurance of energy supply, including a reduction of the dependence on mineral oil and a diversification of energy sources and suppliers;
- Long-term provision of energy at acceptable overall costs to the national economy;
- Adequate and early consideration of environmental aspects and requirements for the protection of the population and the personnel concerned against the hazards of the conversion and use of energy;
- Increase of technological efficiency to maintain economic competitiveness in energy technology.

Research into and development of new technologies as well as their demonstration may contribute to achieving the above-mentioned objectives. Quick success, however, is not to be expected. If our plans are not extended to cover longer periods of time, we can hardly expect research policy to contribute toward assurance of energy supply. Research, development and demonstration of new technologies are focussing on the following main areas:

Efficient use of energy

About 40% of the energy requirements in the Federal Republic of Germany account for space heating. This is why technologies reducing low-temperature energy requirements, such as co-generation for district heating, heat pumps, heat insulation measures in house-building, etc. are very important. This mainly involves the further development and commercialization of existing technologies. The Federal Government has therefore allocated substantial funds for the demonstration of district heating systems and housing facilities in which energy-efficient technologies are tested.

In the transport sector, alternative fuels are being investigated and fuel-efficient engines are under development. The aim in the industrial sector is to optimize production processes and save process heat.

Measures only limited to research, development and demonstration do not suffice to assert a policy of energy saving and efficient use of energy. This is why the Federal Government has taken a number of measures ranging from legal provisions prescribing certain energy saving measures to direct subsidies and tax incentives intended to facilitate the application of energy-efficient technologies.

Use of coal

Coal is our only important domestic energy source and hence one of the cornerstones of our energy supply. At present—and this will certainly also hold for the medium term—coal is mainly used for power generation. Research and development activities in this field concentrate above all on a less polluting way of coal conversion. This applies in particular to the desulphurization of waste gas produced in the coal conversion process, to the improvement of the efficiency of coal conversion and to the development of smaller heating power stations able to cogenerate electricity and heat.

But this does not mean that there are no other applications of coal. Soaring energy prices and the future depletion of our most important energy sources, oil and gas, will render coal gasification and coal liquefaction economically more attractive. The Federal Government has therefore decided to launch a program for the demonstration of coal conversion plants which will ensure the development and introduction of these politically and economically desirable technologies. In this context reference should be made to U.S.-German cooperation, which is particularly intensive in this field.

Nuclear energy

The Federal Government holds the view that in the future this energy source will retain its importance as, in view of the situation described above, we just cannot afford to forego any energy source. The government therefore deems limited nuclear energy development both necessary and justified after all possibilities of energy saving have been exhausted and after domestic hard coal and lignite resources have been used in the first place, provided that satisfactory solutions can be found to the problems raised by back-end fuel cycle operations.

Research, development and demonstration in this field focus on reactor safety and on closing the nuclear fuel cycle as well as on the development of advanced reactor types.

The aim of reactor safety activities is to keep the risk for the population at large and for the people employed in the nuclear industry at the same low level as at present, even when nuclear energy is used on a larger scale. The efforts made to close the nuclear fuel cycle concentrate on demonstrating the safe interim storage and final disposal of radioactive wastes as well as on the demonstration of spent fuel reprocessing on an industrial scale, if possible, and on research into technologies for direct spent fuel disposal. Among the advanced reactor types, the Fast Breeder Reactor and the High Temperature Reactor enjoy special promotion, the former because of its high degree of uranium utilization and the latter because of the possibilities it offers for coal gasification.

“Measures only limited to research, development and demonstration do not suffice to assert a policy of energy saving and efficient use of energy.”

Renewable energy sources

In view of the situation prevailing on the world energy market, all energy sources available will have to be utilized. The Federal Government therefore promotes with great commitment and substantial funds the development of those energy sources, which will be of particular importance for long-term energy supply.

Solar, wind, geothermal and biochemical energy may make small, yet important contributions to our energy supply. The Federal Republic promotes in particular solar energy for low-temperature applica-

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tions and wind energy for decentralized power generation. Under multilateral and bilateral development programs—in the first place with developing countries—the Federal Government also promotes projects using solar energy for power generation, above all for decentralized use in those countries which do not yet have the infrastructure required for power distribution.

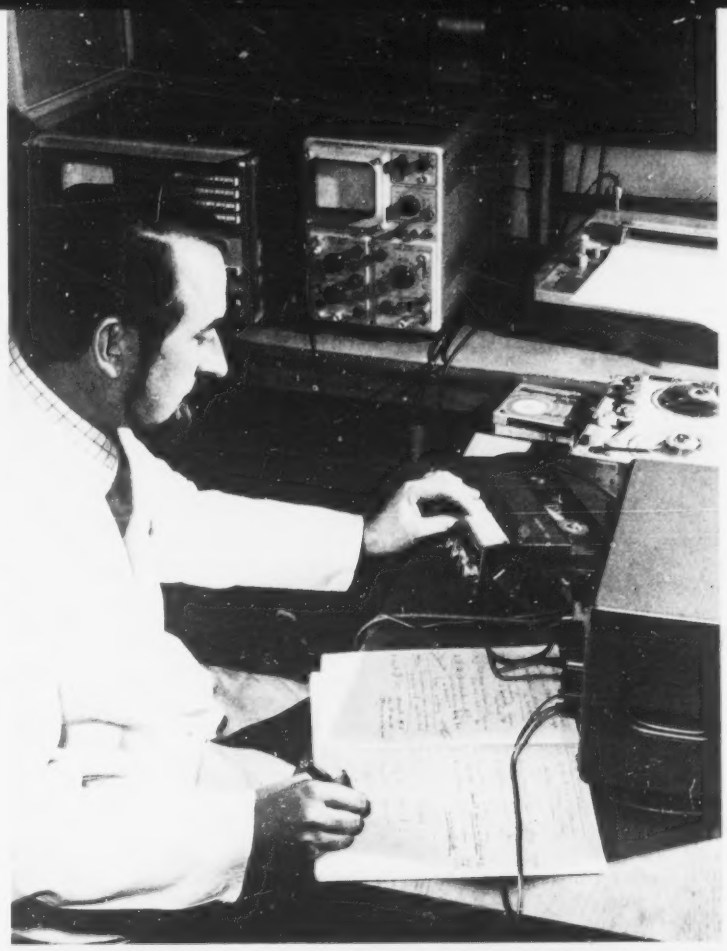
Forecasts estimate that in the Federal Republic by the year 2000 the new energy sources will be able to contribute about 30 million TCE to the final energy supply. This implies that research and development activities will have to be continued vigorously and that the use of these energy sources in households and in industry will be promoted by the government to an even greater extent than before.

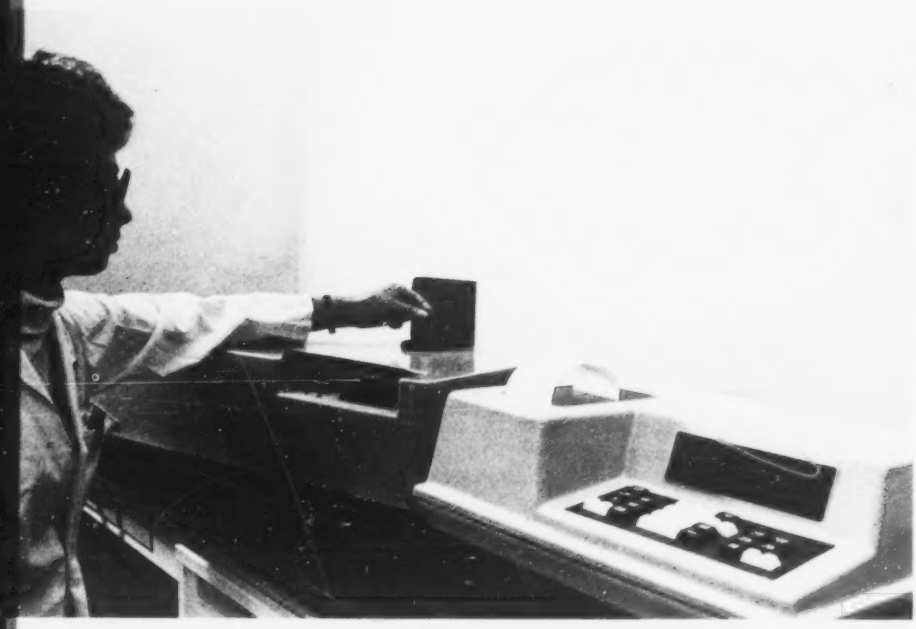
"Solar, wind, geothermal and biochemical energy may make small, yet important contributions to our energy supply."

The significance of energy research and of the development of new energy technologies for our entire national economy needs government commitment because

- research, development and commercialization of new technologies take so long that many of these technologies cannot be expected to be profitable in the forseeable future;
- the technico-scientific risk involved is estimated to be so high that, without government promotion, research, development and demonstration would not be initiated;
- the financial effort and the economic risk involved in the necessary development are so great that often even large industrial enterprises cannot conduct the necessary research activities without government aid;
- the economic optimization of technologies as conducted by businesses does not comply with all overriding objectives right from the outset. This applies in particular to the consideration of environmental aspects, of the protection of the population, and of industrial safety as well as of the reduction of dependence on imports.

In order to develop the necessary technologies in a market-oriented manner right from the beginning and give the





research, development and demonstration program concerned the greatest possible impact, close cooperation between science, industry and government is called for. Research programs are elaborated and conducted in a broad-based, decision-making process including the intensive consultation of all groups concerned. In addition to institutionally promoted developments, e.g., at national research centers, the government promotes appropriate projects with public funds directly at the industrial level. As a rule, the businesses concerned share the cost proportionately so that they are always forced to review by themselves whether their money is being spent usefully. The direct participation of industry facilitates the commercialization of new technologies.

Obviously, there are limits to governmental energy research policy. First, there is a financial framework in which such projects have to be carried out. Energy research has to compete with other political priorities of government policy for the funds available, and this means, of course, that those, too, are limited and that, therefore, in the energy sector as well, not everything can be done that could be done, but that one has to focus on those priority areas where the potential to reach the given objectives is highest.

Summary

Structural changes in our energy supply are necessary if we want to assure this supply in the long term. Research, development and demonstration may make an important contribution in this respect. However, the government cannot solve these problems alone; government, science, industry and—last, but not least—the individual who has to accept the newly developed technologies, have to cooperate to really achieve the established objectives. ■

DEUTSCHE ZUSAMMENFASSUNG

Der Verfasser stellt das Konzept der Forschungs—und Entwicklungspolitik der Bundesregierung fuer den Energiesektor dar. Er begruendet, warum die Industrielaender ihre Energieversorgung umstrukturieren muessen, um langfristig ihren Bedarf sicher decken zu koennen bei gleichzeitiger Beruecksichtigung der steigenden Energienachfrage der Entwicklungslaender und der besonderen Interessenlage der Oelstaaten. Der Autor erlaeutert die Notwendigkeit einer Zusammenarbeit zwischen Regierung, Wissenschaft, Wirtschaft und dem einzelnen Buerger, der mit den neu zu entwickelnden Technologien leben soll. Dabei gibt er einen Ueberblick ueber die Forschung, Entwicklung und Demonstration sowie ueber die Aspekte und Zwaenge, die ein entschlossenes Vorangehen auf dem beschriebenen Weg unumgaenglich machen. Der Artikel zeigt auch die erkennbaren technischen Moeglichkeiten zur besseren Nutzung vorhandener und Einfuehrung neuer Energiequellen auf. Dabei werden insbesondere die Problembereiche Kohle, Kernenergie und Umweltschutz ausfuehrlich diskutiert.

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Charles Sack, Präsident, HCM Graphics Systems Inc., Tochtergesellschaft eines deutschen Unternehmens.

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Contingency Planning for an Energy Emergency

by Scientists and Engineers for Secure Energy and The Hoover Institution

Americans and Europeans alike are increasingly disturbed by the nightmarish possibility of a protracted cutoff of foreign oil deliveries, whether due to political action or military activity. This summer a group of eminent American academicians and industrialists met to draw up a program designed to minimize the United States' dependence on imported fuel. Their final statement has been described by American Nobel Prize Laureate Dr. Hans Bethe as the currently definitive word on the subject.

A sense of urgency permeated a meeting of 60 of the nation's leading academicians and industrialists concerned with energy problems. Convened June 16-18 at Stanford University and entitled "Contingency Planning for an Energy Emergency," the colloquium dealt with the consequences of a sudden cut-off of oil from the Persian Gulf.

The prolonged interruption of oil supplies from the Gulf by any one of a number of scenarios (for example: revolution or Soviet expansionism) is a real possibility. There was nearly unanimous agreement that the economy of the United States and of its allies would be in jeopardy if this occurred, and that immediate programs to reduce this vulnerability should be instituted.

The colloquium was sponsored by Scientists and Engineers for Secure Energy and by the Hoover Institution. The participants considered how the energy requirements of the United States could be met if the contingency occurred. The physical limits of a national response covering a period of five years from the cut-off were investigated. Topics discussed included: emergency conservation measures; possible expansion of oil supplies from alternate sources; substitution, when possible, of gas, coal and electricity for oil; effects on electric power generation; rationing and other forms of allocation; economic effects and changes in life style; and advance preparations to reduce our vulnerability.

"The physical limits of a national response covering a period five years from the cut-off were investigated."

The Colloquium findings

The initial situation faced by the industrial democracies after a complete cut-off (which is a limiting case of more probable partial cut-offs) would be a short-fall of about 45% of their oil supplies, or 16 million

barrels/day. According to the existing oil-sharing agreements between the U.S. and the other members of the International Energy Agency, the short-fall would be distributed as follows:

- U.S. oil supply would be reduced about 35%, by 6 million barrels/day,
- oil supply of our allies would be reduced about 55%, by 10 million barrels/day.

As a result, in the United States a Mideast cut-off would:

- Cause the transportation system to be greatly disrupted. Private automobile use would be reduced about 50%, and other vehicle transportation would be cut about 30%;
- Cause massive additional unemployment of over 8 million workers, and reduce annual disposable income by over $3,000 per household;
- Impair our ability to mobilize effectively to defend ourselves, and imperil the security of the free world;
- Lower the gross national product by $350-650 billion per year (about 15 to 25%);
- Depending on the timing of the cut-off and the region of the country, one could expect the closing of some housing space, or abandonment of some types of housing

"The security of the United States requires the implementation of an aggressive program . . ."

which the users might not be able to heat; accelerated movement of people to a warmer climate; relocation of people closer to their places of work; and perhaps even dormitory housing for younger workers near industrial enterprises (as occurred, for example, at Oak Ridge during World War II);

- Shopping habits would undergo dramatic changes, and recreational and cultural activities would be greatly curtailed.

In the five years following an oil cut-off (assuming only present technologies could

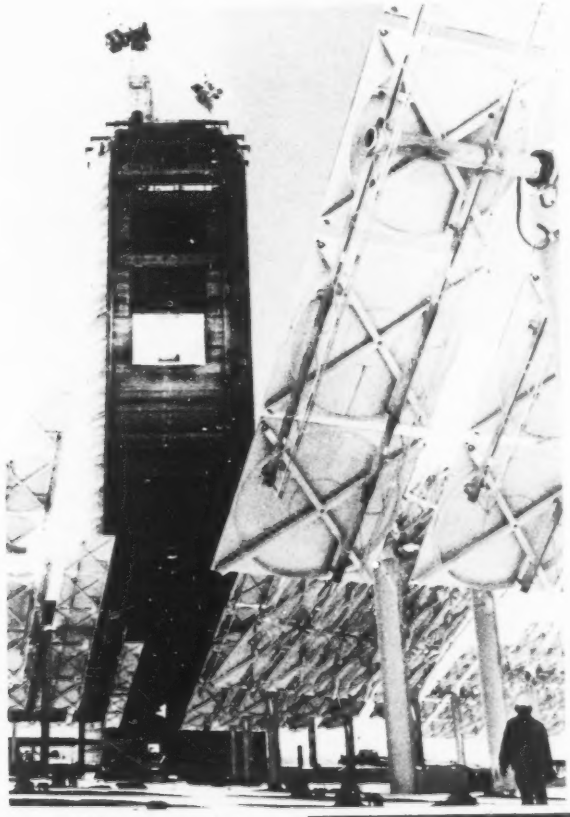
> ***"Rapid decontrol of oil and gas prices and abolition of entitlements are the most important ways of providing needed incentives"***

be effective on a large-scale), replacement of the U.S. oil supply deficit by determined expansion of domestic and other foreign oil supplies and by substitution of other fuels would be substantial but still only partial (40-60%).

opportunities for increased sources of energy supply are: coal, gas, nuclear power, biomass, and on a longer time scale, shale oil. As was proven during World War II, high level policy organization is an absolute prerequisite for organizing and implementing an effective program.

2. Rapid decontrol of oil and gas prices and abolition of entitlements are the most important ways of providing needed incentives to displace oil imports by inducing real conservation and increasing supply. Equity concerns, such as undue burdens on people with low incomes, should be dealt with by income transfers rather than by manipulating prices or by allocations.

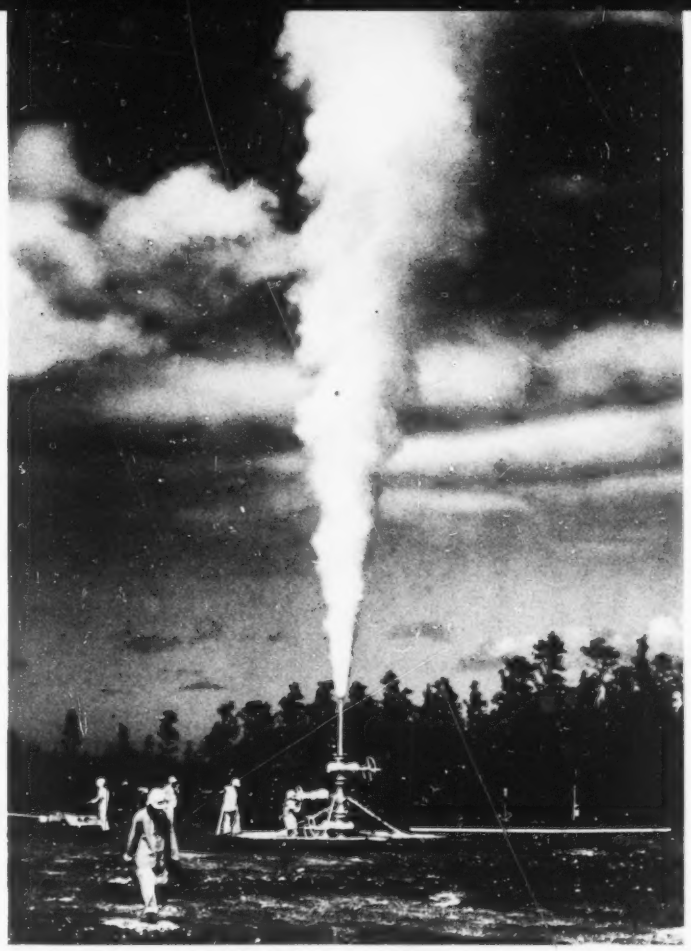
3. Environmental laws should be administered and perhaps amended to



To avoid the vulnerability of our society to these consequences, participants recommended a number of measures. While further measures may be necessary or advisable, there was general agreement that the following should be adopted.

1. The security of the United States requires the implementation of an aggressive program to increase both energy production and the more efficient use of oil. The object of this program should be to reduce vulnerability to loss of imported oil as quickly as possible. Examples of

> ***"Licensing for operation of completed nuclear plants should be expedited in order that the plants may be put in production immediately."***



encourage energy production as well as to protect the environment, thus reducing the danger that curtailments caused by an oil cut-off will harm the health and welfare of the American people.

4. Licensing for operation of completed nuclear plants should be expedited in order that the plants may be put in production immediately. Partially completed power plants (both coal and nuclear) should be completed on an accelerated schedule. Unnecessary regulatory impediments to other energy facilities (such as pipe-lines, port facilities and drilling platforms) should be removed.

5. Oil for non-transportation uses should be replaced by natural gas and coal- and nuclear- generated electricity as soon as possible. Limitations on production and use of natural gas and electricity should be reduced to permit price competition to determine their relative market shares. Electric utility rates should more nearly reflect the marginal costs of new power plants.

6. The energy industries should with government encouragement jointly prepare emergency plans against an oil cut-off. Among other measures, acquiring spare production and storage capacity should be encouraged.

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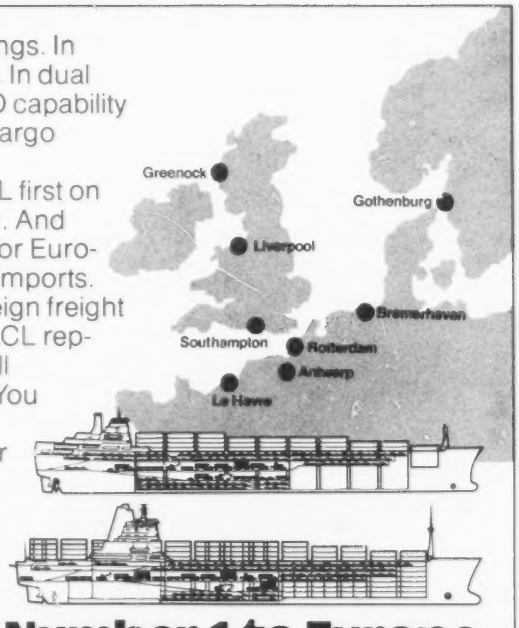

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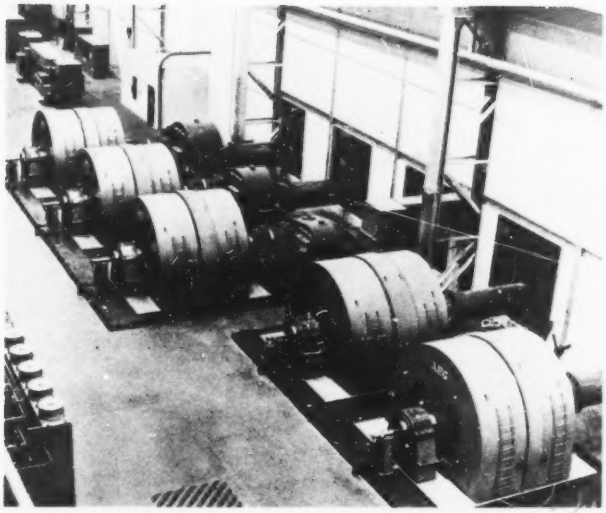

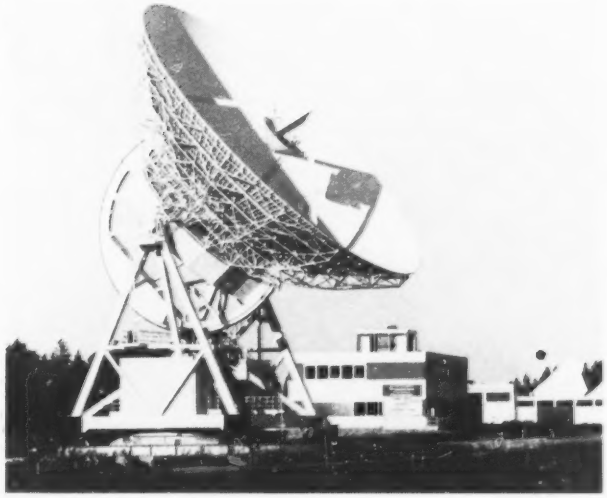

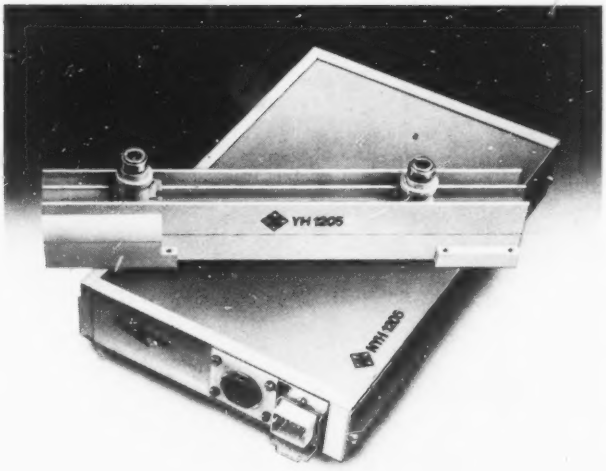

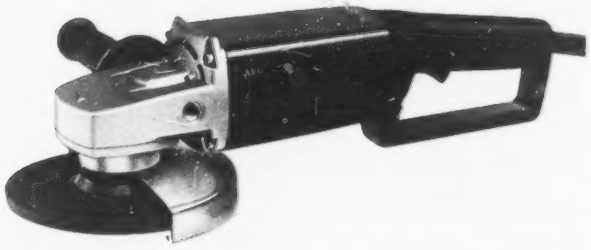

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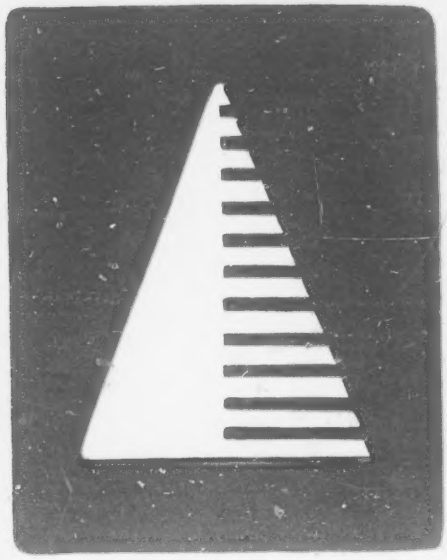

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7. The automotive industries should be encouraged to increase their efforts to produce more fuel efficient automobiles, including electrical and hybrid vehicles.

8. Contingency plans should be made to curtail energy consumption and to suspend temporarily some procedural requirements and environmental standards, in the event of an oil cut-off. Wide public discussion of these plans at the community and the factory levels should be inaugurated.

9. In addition to our present commercial operational oil reserve (about 30-40 days of total imports), we should begin to fill the Strategic Petroleum Reserve (SPR) at a rate of more than 300,000 bbl/day. Note that at a rate of 100,000 bbl/day, it would take 20 years to accumulate an amount of oil which would cover the maximum projected deficit (6 million bbl/day) for four months. To the extent possible, the SPR fill should be achieved by reduction of current oil consumption according to the preceding recommendations.

10. Since the use of oil in Western Europe and Japan for generating electricity is about 3 million barrels per day, it is in our mutual interest to reduce their vulnerability by encouraging and assisting their conversion to nuclear energy and coal.

Implementing the foregoing recommendations would, as time passes, progressively reduce the severity of the initial shock of an oil cut-off and the duration of the recovery period.

The undersigned participants subscribe to the general sense of the above statement as individuals (affiliations for identification only):

SIGNATORIES AS OF JULY 24, 1980

Robert K. Adair	Yale University
Donald G. Allen	New England Electric Co. (ret.)
Hans A. Bethe	Cornell University
Elliot Bloom	Stanford Linear Accelerator Center
Harvey Books	Harvard University
Arthur M. Bueche	General Electric Company
Toby Burnett	Westinghouse Electric Corporation
Peter Camp	General Electric Company
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Carolyn Meinel Henson	L5 Society
Frederick A.L. Holloway	Treasurer, National Academy of Engineering
Richard J. Kessler	Center for Strategic and International Studies
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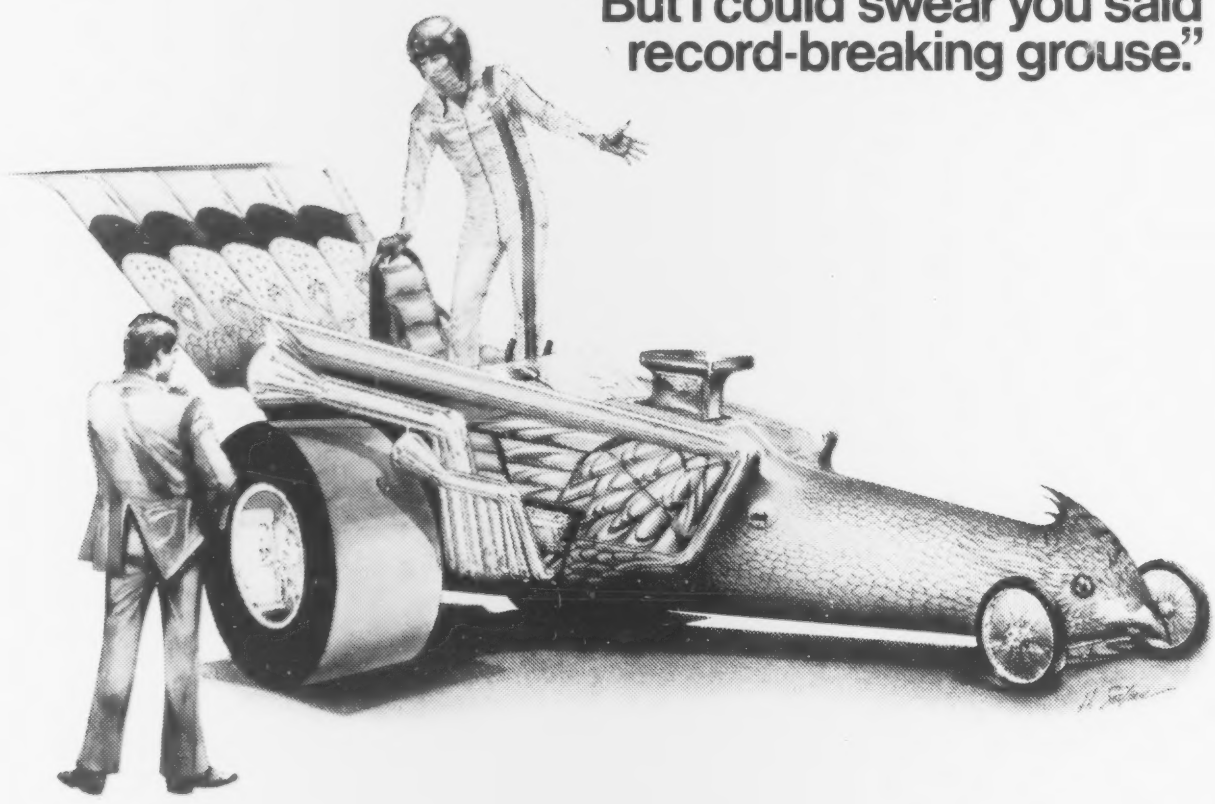
Edward Teller	Hoover Institution
Miro M. Todorovich	City University of New York
Robert K. Whitford	Purdue University
Eugene P. Wigner	Princeton University
Bertram Wolfe	General Electric Company
Charles A. Zraket	The Mitre Corporation

DEUTSCHE ZUSAMMENFASSUNG

Vom. 16. - 18. Juni 1980 haben 60 fuehrende amerikanische Wissenschaftler und Industrielle in Stanford ein Collegium zu einer moeglichen US-Krisenplanung im Energiebereich fuer den Fall eines Oelembargos abgehalten. Die Schlusserklaerung dieses Collegiums, die von dem amerikanischen Nobelpreistraeger Dr. Hans Bethe als die gegenwaertig reifste Aeusserung zum Thema bezeichnet wurde, ist im vorstehenden Text wiedergegeben.

Ausgehend davon, dass eine Unterbrechung der Oelzufuhr durchaus Realitaet werden kann, wurde die Notwendigkeit zur sofortigen Ausarbeitung eines Planes zur Verminderung der Importabhaengigkeit bei Oel postuliert. Bei der Diskussion zur moeglichen Form eines solchen Planes ging man von einer fuenfjaehrigen Unterbrechung der Oelzufuhr aus. Sodann untersuchte man die Folgen eines angenommenen Ausfalls von 16 Millionen Fass Oel am Tag auf die USA, wobei eine Kuerzung der US-Oeleinfuhrmenge um 35% und der europaeischen Oeleinfuhrmenge um 55% angenommen wurde, wie von der Internationalen Energieagentur in Paris fuer den Krisenfall vorgesehen. Zur Vorbereitung auf den Ernstfall schlaegt die Schlusserklaerung ein 10-Punkte-Programm vor: Steigerung der heimischen Energieerzeugung und bessere Nutzung des Oels; Freigabe der Oel- und Gaspreise, um alle Initiativen zur Produktion,- Nutzung und Einsparung von Energie zu wecken; Ergaenzung der Umweltschutzgesetzgebung, um neue Moeglichkeiten zur Energieerzeugung zu schaffen; beschleunigte Erteilung der Betriebsgenehmigungen fuer fertiggestellte Kernkraftwerke; beschleunigten Ersatz des Oels durch andere Energietraeger wo immer moeglich (nicht im Verkehrsbereich); Ausarbeitung von Energiekrisenplaenen durch Regierungen und Energieversorgungsunternehmen; Foerderung der Entwicklung neuer Antriebsarten in der Fahrzeugindustrie; Rationierungsplanung zur Verminderung des Energieverbrauchs und zur Verteilung der vorhandenen Mengen; Auffuellung der strategischen Rohoelreserve auf einen Viermonatsvorrat; Hilfestellung an Europa und Japan zur dortigen Umstellung auf Kern- und Kohleenergie.

"But I could swear you said record-breaking grouse."



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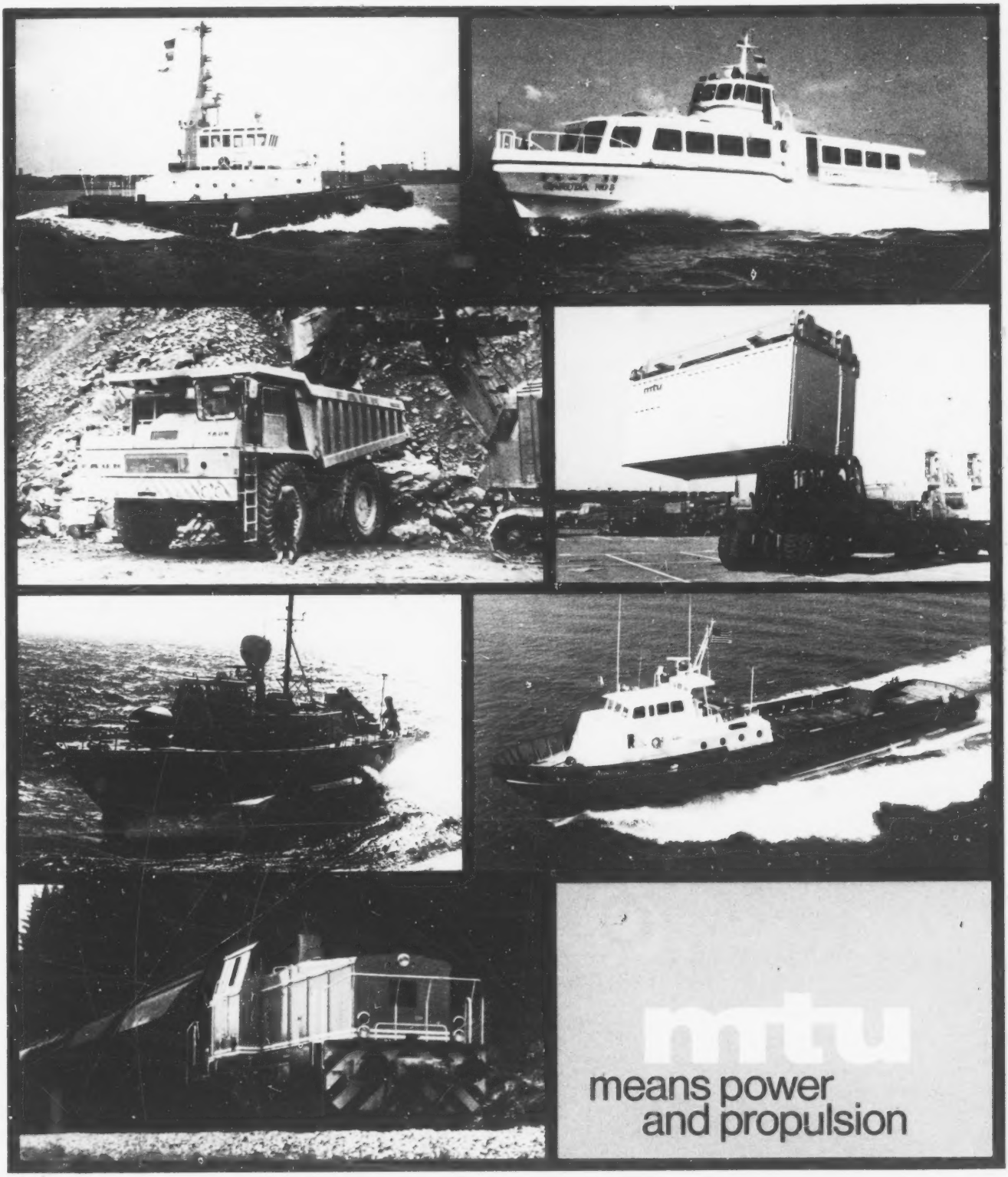

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America's Energy Future

by H. R. Hill
Executive Vice President,
General Electric Company

A major change has taken place in the operating climate of the electric utility industry in the United States. Beginning with the 1973-74 oil embargo, and continuing with the environmental and regulatory concerns, the previous picture of heavy growth of electrical power usage has become a thing of the past.

Electric energy consumption grew 3 percent the past year and a small growth, if any, is expected in 1980. A pick-up in load growth is expected next year as the economy improves but that growth will still be less than half the 1973 increase.

Such factors as inflation, energy, environmental legislation, and fuel price rises have caused major upsets and changes in the direction of the electric utility industry in recent years. In addition, the industry has been affected severely by capital formation problems and its ability to seek rate relief in a timely fashion.

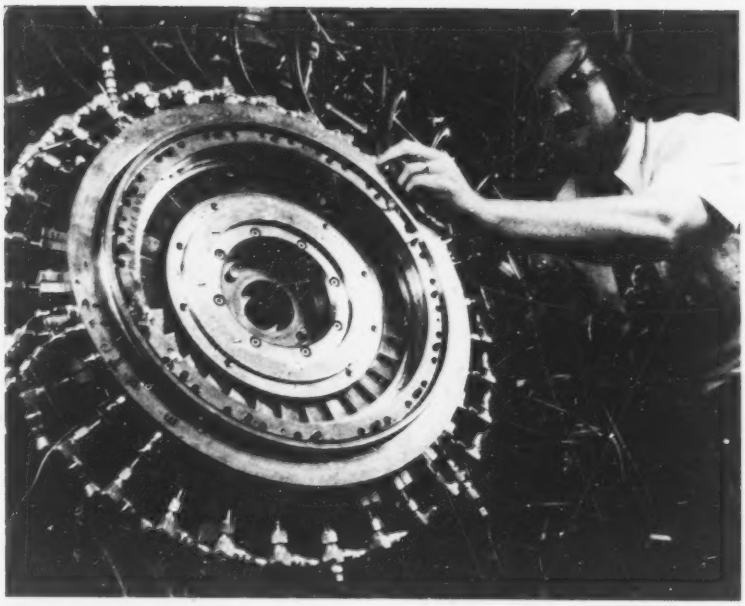
It is important, however, to keep in mind that the overall U.S. energy difficulties are not the result of a shortage of energy. They are the result of our dangerous dependence on imported oil *and* of self-imposed restrictions on using the many energy alternatives that are available to solve the oil import problem, including nuclear, coal, hydro and other renewables.

Before discussing some of the new problems, a brief review of the nation's anticipated total energy needs between now and the year 2000 would be helpful.

When the growth rate of the past 30 years is extrapolated for the remainder of this century, total energy use in the United States could be expected to nearly triple from 80 quads (a quad is a quadrillion BTUs) to nearly 200 by the year 2000. That figure could be reduced to 175 quads per year when a slowed population growth and other demographic factors are taken into consideration. Saturation of some high energy use functions could reduce that figure to 140 quads. And some estimates say the impact of energy conservation and the substitution of available resources for oil will reduce the need to somewhere between 100 and 110 quads.

That is one of the lowest of the projections cited recently by the Department of Energy after it had looked at a wide variety of studies by experts from government, industry, universities and others. So at the least, the United States must develop 20 to 30 quads to meet the demand growth, and more if we are to make a significant reduction in imports.

Today oil represents nearly half or 37 quads of the nation's energy. Natural gas accounts for 20 quads and hydroelectric power produces about 3. Nuclear energy accounts for 3 quads and coal produces 15



quads. Solar heating systems, biomass (burning of wood and agricultural wastes), geothermal (using heat from beneath the earth's surface), and the small contributions from such sources as windmills constitute the rest, or about 2 quads.

The problem the U.S. faces now is how to get from the present 80 quads to the need of 100-110 projected for the year 2000.

Domestic oil production in total quads, according to the present expert consensus, will decrease, at least slightly. But this projection is based on the hope that it will be possible to maintain, and possibly increase, domestic production, including some oil from shale. This prediction also assumes a relatively high level of oil imports throughout the period. Obviously, a variety of geopolitical and economic factors make any such predictions very uncertain.

Natural gas from conventional wells is expected to experience an overall reduction in availability from 20 quads down to below 15. Other experts hope there will be new finds, unconventional sources, or more imports from Canada or Mexico—and they say it may be possible to keep natural gas supplies nearly constant. This, again, is an optimistic projection which suggests the status quo can be maintained, but one may expect that synthetic gas will contribute to leveling the gas form of energy. On the other hand, the American Gas Association suggests that from 24 to 30 quads of gas could be available, although the sources have not yet been defined.

Renewable sources are expected to increase to 10 quads by the year 2000, with hydroelectric and geothermal increasing to 5 quads. Solar heating, windmills and biomass should account for the other 5 quads.

As for nuclear, the plants now actually on the order books, but not yet on stream, would provide an additional 7 quads, for a total of 10. New orders could raise this to about 12. But the industry is now virtually at a standstill, with no new orders coming in.

What the nation needs, it would appear, is how to close the energy gap with coal and nuclear—the two energy sources that are the most viable for the years ahead. Analyses by General Electric experts indicate that they are today's only energy technologies capable of providing large-scale alternatives to imported oil from now until at least the year 2000.

Coal is the nation's most abundant energy resource, with enough to last at least several hundred years. But a major effort will be required to help meet the rapidly escalating costs of digging, moving and cleaning coal, as well as solving the related environmental problems. Nuclear, viewed rationally and objectively, is a proven technology. The U.S. has more than two decades of experience in building and operating nuclear power plants. They work. They are economical. If viewed the way we see virtually every other aspect of modern life, they rank as one of the safest major developments in the history of technology.

It is, therefore, very disturbing to see opposition to a basically proven source of energy, especially in a period of few energy options plus a dangerous dependence on fragile foreign oil supplies.

There is enough uranium fuel to last well into the 21st century, providing time to develop longer-term prospects like solar electricity, thermonuclear fusion, solar-assisted hydrogen production, and whole new families of synthetic fuels.

U.S. nuclear electric generation is now delivering each day the power equivalent of five tankers, each filled with 260,000 barrels of imported oil. It meets about 13% of U.S. electrical needs and is supplying this electricity at costs well below those for fossil-fueled generation.

For these reasons, my company supports the development of nuclear energy, with concurrent emphasis on multiple safety provisions to protect the public.

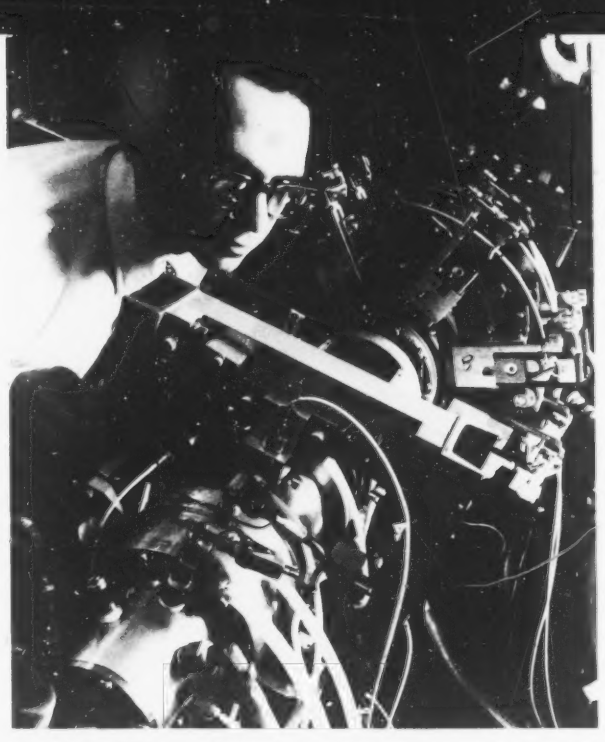
There have been problems, but overall the basic record of commercial nuclear operations in the United States has been outstanding. It is our view that problems arising from the country's not going ahead with nuclear power will have much more serious impact than those that will result from proceeding with the use of nuclear resources.

General Electric continues to invest very

heavily in advancing the technology of its boiling water reactors for electric power generation. It is a reflection of these investments that U.S. boiling water reactor plants in 1979, for the second sraight year, led all domestic light-water reactor plants in average availability and capacity factor—key measures of overall reliability for nuclear power plants. Training of nuclear plant operators continues to be emphasized with the recent inauguration of a second training center for boiling water reactor operators.

Programs to substitute coal for oil and gas wherever possible should also have high priority in the U.S. Work toward this objective, for instance, is going forward in a wide array of projects in General Electric laboratories and pilot plants. These projects aim at more efficient, cleaner, lower cost methods to convert coal to power and synthetic oil and gas.

An interesting result of some of these projects is the program to build this country's first integrated gasification/combined-cycle (IGCC) demonstration plant. The 100-megawatt facility at Southern California Edison's Cool Water generating plant at Daggett, California will convert coal to gas, clean the gas of pollution-causing contaminants, and then burn it to produce



electricity. GE is negotiating its participation in this project.

The Cool Water plant is scheduled for completion in 1983, and is a prototype for plants of 500 megawatts or more that could compete in cost with plants that burn directly, but with fewer pollution problems. If the project is successful, it could make

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available to the utility industry by the late 1980s a more economic and environmentally acceptable option for generating electricity from coal.

On another coal gasification project, GE is a participant in supporting Central Maine Power in a design study for a new commercial version (IGCC) plant of about 500 megawatts being considered for the utility's Sears Island location.

An additional project with great potential involves the development of an environmentally compatible, superefficient, water-cooled gas turbine expected to be 20% to 25% more efficient than the most advanced conventional generating systems available today. The water-cooled turbine will be able to generate twice the power of existing gas turbines of the same physical size. Construction and testing of a high-temperature turbine is planned for the mid-1980s.

"... the sums invested in research and in their further development have been increasing rapidly in recent years."

While nuclear and coal are the most viable energy sources for the immediate future, many new technologies are being explored for introduction during the latter part of this century. These programs are costly, and the return on investment is in the future. However, the sums invested in research and in their further development have been increasing rapidly in recent years. For example, of the $1.4 billion spent within General Electric on research and development last year, about one-third was for energy-related technologies.

Solutions to the energy crisis are spread across a wide technical front—so wide, in fact, that the following sampling must be confined to several of the many projects in which my company, as just one example, is now participating.

One of the more promising of these is pressurized fluidized combustion. This process burns coal in a bed with dolomite added for sulfur removal. The combustor produces heat to convert water to steam for use in driving a steam turbine-generator. The fluidized bed exhaust gas, after hot gas cleanup, is used to drive an industrial gas turbine-generator. The sulfur released by the coal combines chemically with the dolomite and, as a result, is carted away with the ash. This provides an alternate to expensive scrubbers now in use. A system ready for use by electric utilities is expected in the late 1980s after a pilot project has demonstrated this technology successfully. We have established that this process is very attractive in terms of United States standards and may prove to have less emissions than high sulfur oil.

A pilot-scale coal gasification plant has been placed in operation at our research laboratory with the capacity to produce 100,000 cubic feet of fuel gas an hour from one ton of low-grade coal suitable for running electric power plants.

Another project involving coal is the molten carbonate fuel-cell power plant. Fuel cells are battery-like devices that convert the chemical energy in fuels directly into electricity. In studies now under way, electricity is produced directly by the electrochemical interaction between oxygen in the air and hydrogen and carbon monoxide produced in the coal gasifier.

Long-term benefits may be derived from the use of fuel-cell power plants. They provide attractive options for optimizing a wide range of fuels, including coal, for producing electricity. Efficiencies are very high, minimal water usage is required and impact on the environment is low. Prototype testing of scaled-down fuel-cell stacks is expected to begin next year.

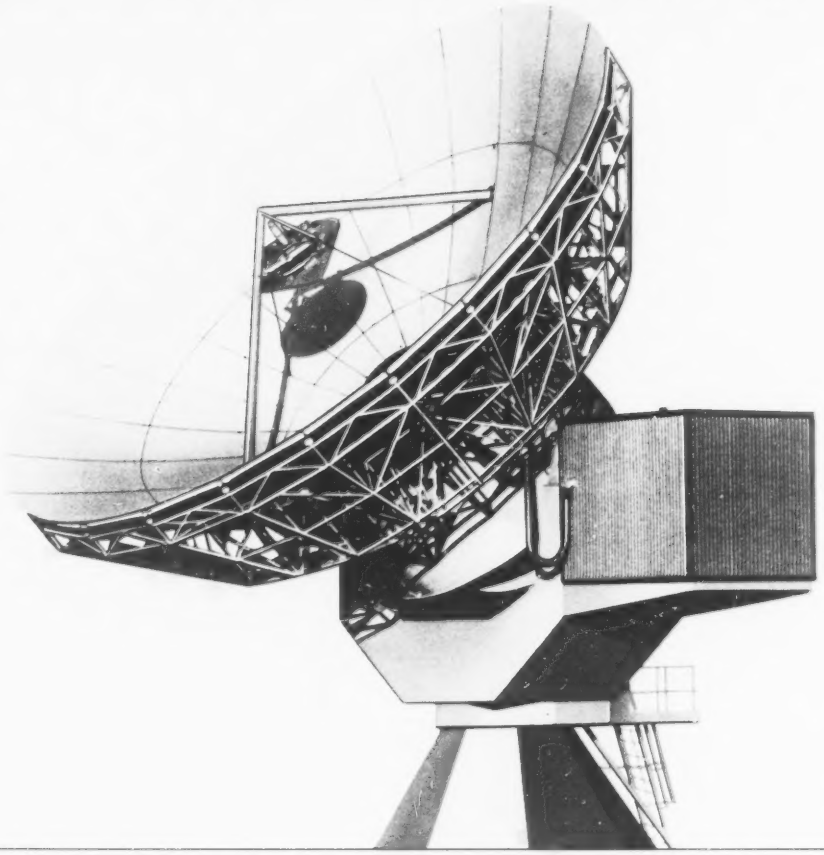
A long-range program under way is the development of a superconducting generator. Cooled to minus 269 degrees centigrade by liquid helium (the coldest liquid in existence), the superconducting generator can produce as much electricity as a conventional machine twice its size. At the same time, generator losses are reduced by one-third to one-half.

A number of projects are being undertaken in the solar energy area. Among them is the design of a solar central receiver power plant rated at 100 megawatts. Plans call for an array of some 20,000 individual guided mirrors, called heliostats, that would track the sun and redirect the sun's energy to a liquid-filled receiver mounted atop a 60-story-high tower. Solar energy, focused onto the elevated receiver, would be concentrated to about 1,000 times the normal intensity of sunlight.

One solar-related project, among a number in which GE has an important role, is the world's largest wind turbine-generator, with two 110-foot long steel blades for the turbine weighing nine tons each.

Harnessing ocean energy is another ongoing project. Known as Ocean Thermal Energy Conversion (OTEC), it utilizes the difference in temperature between surface and deep ocean water to generate electricity.

We have an ear to the ground in the American market, too.



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EVERYBODY'S PLAYING FOLLOW THE LEADER.

As you've probably noticed, the Volkswagen Rabbit's imitators are multiplying like, well, rabbits.

But copies are copies.

And while others are busily copying the Rabbit's looks, they're also busily complaining about meeting the U.S. Government's 1985 fuel-economy standards.

Volkswagen meets those economy standards today.

And while debate over passive-safety restraint systems drags on, you can buy a Rabbit "L" with a system that meets the 1984 safety requirements today.

In short, cars that try to look like the Rabbit from afar don't quite make it from anear. But then, why should anyone have thought they would?

Quality always tells. In handling. In performance. In the paintwork. In the way things fit.

Car and Driver said that the Rabbit "has a structure that feels as substantial as a Mosler safe."

So before you consider a car that looks like a Rabbit instead of a car that is a Rabbit, remember one thing:

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VOLKSWAGEN DOES IT AGAIN

> ***"... even with governmental funding, it will take many years and tens of billions of dollars to build a synfuels industry."***

Geothermal power taps underground steam and hot water for a steam turbine. Several turbines have been built by General Electric, for instance, for the 1,100 megawatts of "hot steam" plants that are operating or planned today. GE turbine people also are working closely with other firms preparing to tap the huge amounts of energy that may be available from hot brine.

Several of these projects and others not enumerated here have a reasonable chance of successful development and demonstration within the next five to ten years. Others are further out, but much technical expertise is nevertheless being applied to them today.

Not to be overlooked, of course, are a number of advanced nuclear technologies, and General Electric expects to play a prominent role in future breeder programs.

The company is involved in the national fusion program in other ways, too, playing a potentially important role in the definition of the electrical equipment for the Fusion Engineering Test Facility—the next large-scale fusion device that will be built.

In another technology field, mention should be made of the large-scale superconducting magnet programs GE has under way for both magnetohydrodynamics (MDH) and for fusion. Although neither of these technologies is expected to contribute to near-term solutions to the energy problem, it is felt they are worthy of our continued effort.

The Administration's program to spend billions of dollars over the next few years to develop synthetic fuels and energy alternatives is a much needed step in the right direction. It is an indication that the nation is now committed to bring to bear all of its strengths in a collaborative way to eventually attain energy independence.

But even with government funding, it will take many years and tens of billions of dollars to build a synfuels industry.

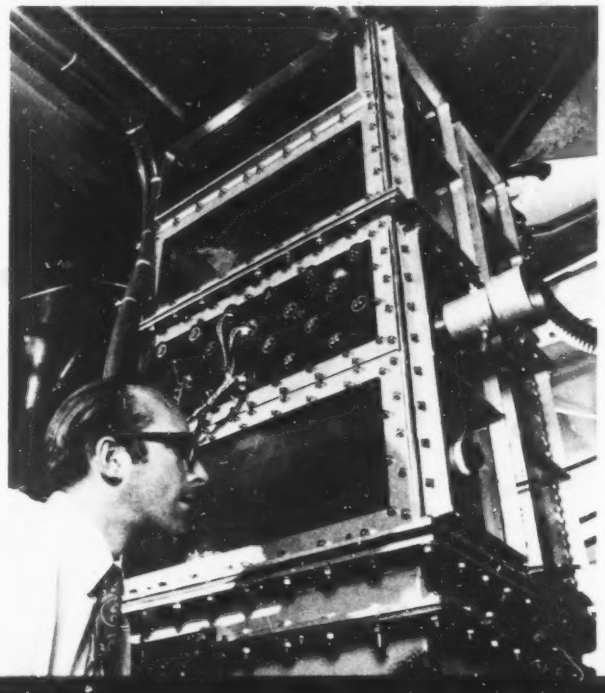
In the meantime, the nation fortunately already has in place an enormous but underutilized energy system that has the ability to solve the oil problem. That system, of course, is the nation's electric utilities whose power grids, interstate power pools and regional interties make up the world's most sophisticated and reliable generation, transmission and distribution network.

With realistic incentives and government support, these utilities could use the power generation capacity they have now as well as that planned for the future to provide electricity as a substitute for other energy sources—especially oil. As already indicated, no other form of energy can be produced from so many different sources of fuels, or applied in so many useful, environmentally-accepted ways.

As the shift away from imported oil to domestically generated electricity accelerates in residential, commercial and industrial uses, current estimates are that the electricity fraction of the nation's primary fuel input could increase from the current 31% to over 45% by the year 2000. This would more than double the present U.S. electricity consumption.

This will not only help reduce the nation's dangerous dependence on foreign oil, but also reduce the balance of payments deficit, and help preserve a high standard of living, while opening the way to new multi-billion dollar markets for such things as electric cars, mass transit, heat pumps, better environmental control, more efficient waste water and sewage treatment, more productive electric factories and automated industrial processes.

The many programs now being carried out by companies like General Electric should be of great benefit also to other nations. Sharing these advanced technologies and the new and improved products for generating power will be mutually profitable for all trading partners. ■



DEUTSCHE ZUSAMMENFASSUNG

Der Verfasser vermittelt einen Einblick in die vielfaeltigen Anstrengungen, die bei General Electric (GE) in Fairfield auf der Suche nach neuen Energiegewinnungstechnologien unternommen werden. Nach seiner Meinung werden in den USA im Jahre 2000 nur noch 31% der dann benoetigten Elektrizitaet aus Oel gewonnen, gegenueber 45% heute. Damit wird nicht nur die Abhaengigkeit der Vereinigten Staaten von importiertem Oel verringert, sondern auch die Zahlungsbilanz entlastet. Ganz neue Industrien werden sich im Rahmen der Elektroindustrie entwickeln.

Seit der Oelkrise 1973-1974 sind die vormals hohen Zuwachsraten des Elektrizitaetsverbrauchs in den USA ruecklaeufig. 1979 stieg der Verbrauch nur noch um 3% an. 1980 wird die Zunahme noch geringer sein. Projiziert man die Zuwachsraten der letzten 30 Jahre auf das Jahr 2000, so wird sich der amerikanische Energiebedarf bis dahin fast verdreifachen. Mit Hilfe von neu zu entwickelnden Techniken koennen die sich daraus ergebenden Probleme jedoch geloest werden. Heute gewinnen die USA fast die Haelfte der elektrischen Energie aus Oel, den Rest aus Erdgas, Atomenergie, Kohle und Abfallverbrennung. Der Atomenergie kommt wachsende Bedeutung zu, falls alle geplanten Atomkraftwerke gebaut und in Betrieb genommen werden koennen.

Nach Berechnungen von GE koennen nach derzeitigem Kenntnisstand nur Kohle und Kernenergie das Oel mit seiner Importproblematik auf lange Zeit ersetzen. Die Kohle verursacht jedoch sehr hohe Gewinnungs—und Transportkosten. Atomenergie ist eine inzwischen ueber zwei Jahrzehnte erprobte, preiswerte und leistungsfaehige Energiequelle. Die bekannten Uranvorkommen reichen auch bis ins 21. Jahrhundert. Waehrend dieser Zeit werden andere Energiequellen neu— und weiterentwickelt werden koennen. Bereits heute deckt die Atomenergie 13% des Bedarfs an Elektrizitaet in den USA und das zu sehr niedrigen Herstellungskosten. Deswegen ist GE auf dem Gebiet der Atomforschung (speziell Heisswasserreaktoren) aktiv engagiert. Natuerlich gab es Entwicklungsprobleme, aber Laender, die auf die friedliche Nutzung der Kernenergie verzichten, werden in Zukunft noch viel groessere Probleme haben. Darueber hinaus arbeitet GE an einer Reihe von Projekten zur preiswerten Substitution von Oel durch Kohle. Eines dieser Projekte ist die Kohlevergasung.

Weitere Forschungsgebiete von GE sind die Entwicklung von umweltfreundlichen wassergekuehlten Hochleistungsgasturbinen, die Mitte der achtziger Jahre in Betrieb genommen werden sollen, die Entwicklung eines neuen Hochleistungsgenerators (superconducting generator) sowie von Windturbinen und Dampfturbinen, die im Laufe der naechsten fuenf bis zehn Jahre auf den Markt kommen sollen.

Neben diesen Projekten wird die Entwicklung von synthetischen Brennstoffen mit hohem Forschungsaufwand betrieben. Ergebnisse in diesem Bereich werden jedoch noch einige Zeit auf sich warten lassen. Bis dahin werden wir die alten, zum Teil wenig genutzten Energiequellen weiterhin benoetigen. Elektrizitaet ist die einzige Energie, die aus so vielen verschiedenen Grundstoffen hergestellt werden kann.

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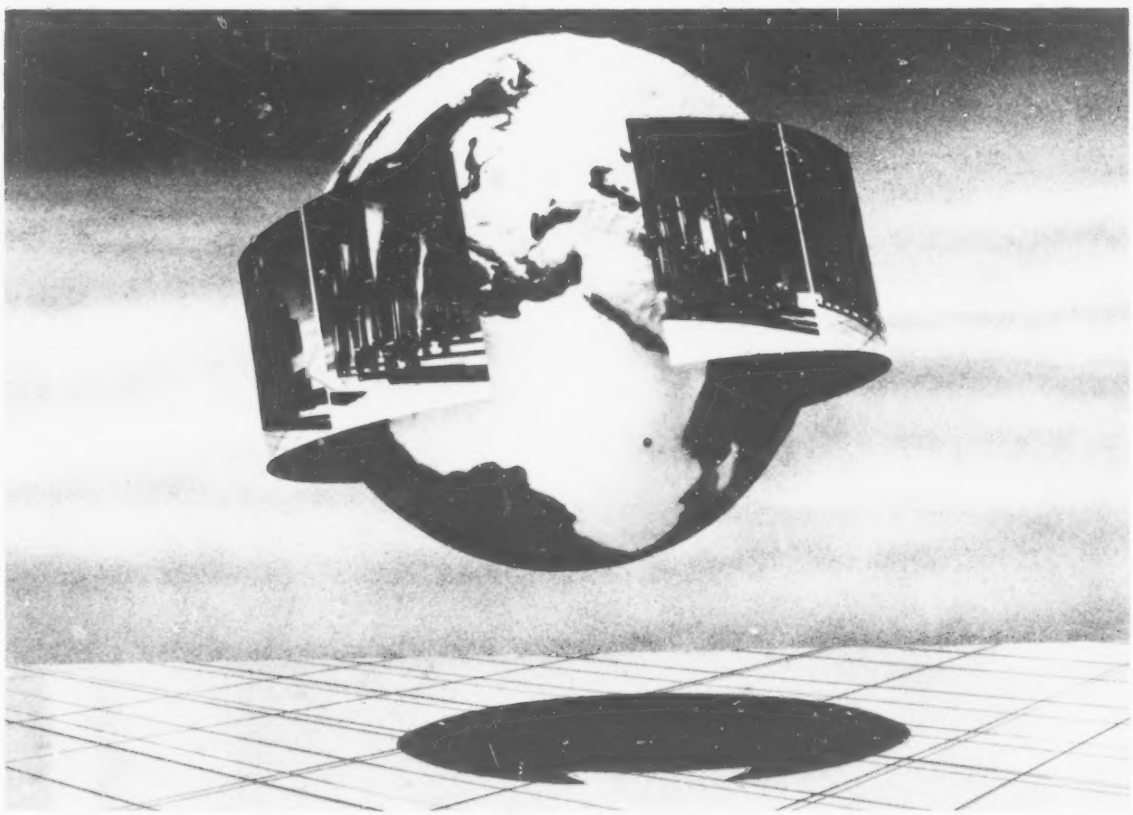

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Nuclear Energy in Germany: Now and Tomorrow

by Dr. Bernhard Pleitner
Chairman,
Siemens AG

At the outset of the Eighties the use of nuclear energy in the Federal Republic of Germany could be characterized as follows: the worst is over, but a multitude of hurdles, difficult to surmount, still lie ahead. Merely the time it takes to construct a nuclear power plant, which ordinarily spans a period of five years for projects of such scale, now takes ten.

Like most other technologies, the peaceful use of nuclear energy developed relatively steadily until 1973, when a sudden change took place. Under the initial impact of the oil crisis a rapid expansion for nuclear energy was planned with the full concurrence of many political decision-makers.

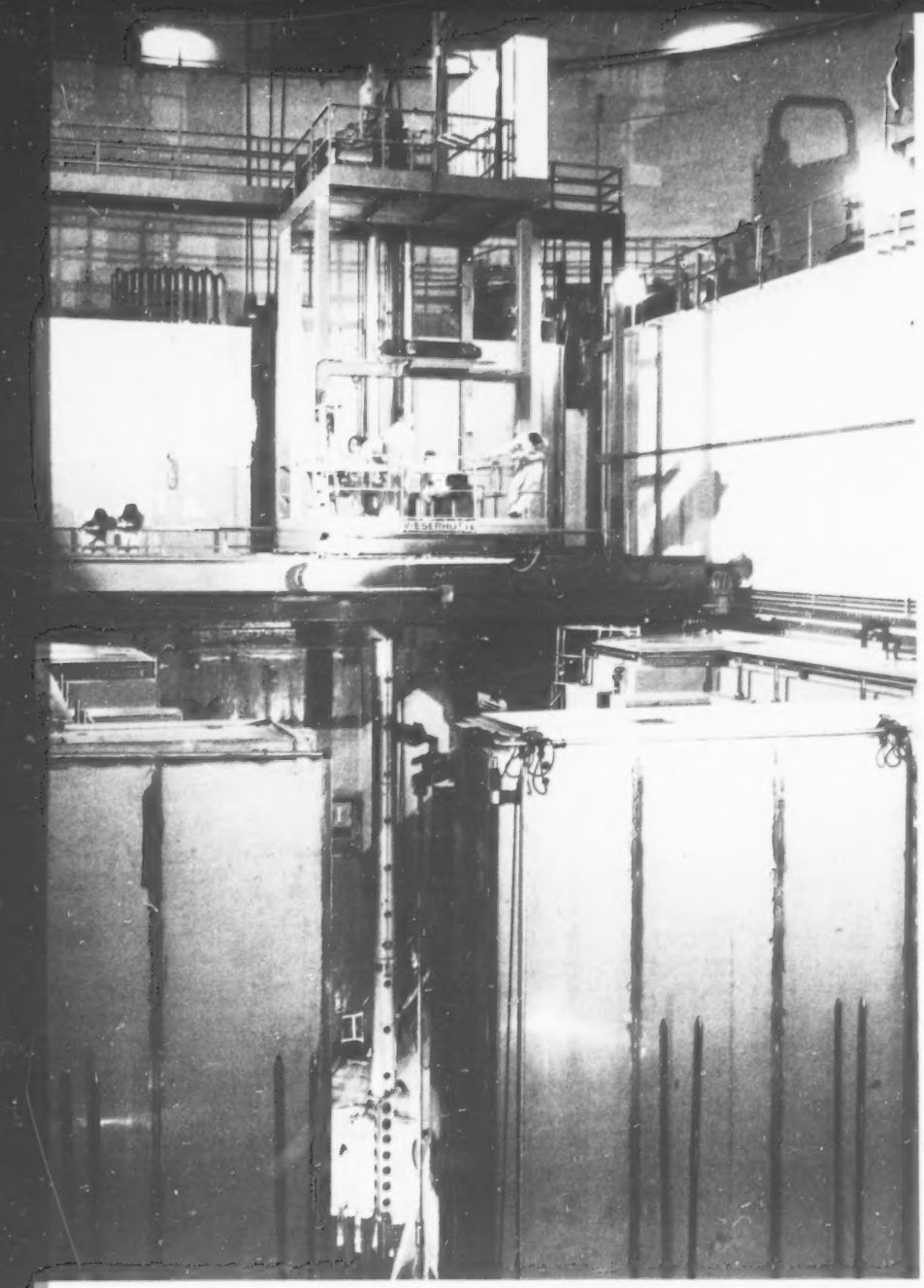
As in other industrial countries, these expansion plans were soon revised downward and the projected nuclear energy output was reduced. The reasons were as follows:

- Energy consumption grew at a lesser rate than expected, due to the unfavorable economic development incurred in the wake of the oil price increases;
- The wish of many politicians to give German bituminous coal preference in fueling electric energy production;
- Broad segments of the population suppressed the recognition that the first oil crisis would not be the last; and
- Rising criticism of economic growth by and large and of large technological installations in particular which were considered a threat to the environment and jobs. These concerns were presented for the most part by persons who by virtue of their education, social status and position found ready access to the mass media that influence public and political opinions. As a symbol of technological gigantism the nuclear power plant became a primary target of this criticism.

Within a few years the opponents of nuclear energy learned to exploit every legal opportunity to the extent that a condition arose whereby more and more groups and persons had to give their approval in deciding on energy questions and, at the same time, fewer and fewer leaders were prepared to make decisions and to take responsibility for these. As a result:

> ***"As a symbol of technological gigantism the nuclear power plant became a primary target of this criticism."***

- In the period from 1976 to 1979 only one order for a nuclear power plant in the



Federal Republic was received. Until now no permits have been issued for its construction;

• In mid-1979 an application for the construction of a reprocessing plant in Lower Saxony was rejected with the comment that even though such a facility was necessary energy-wise and technically feasible, its construction was nevertheless politically indefensible at the present time.

Consequently, the use of nuclear energy in the Federal Republic has reached a level whereby 14 nuclear power plants, generating 9.059 Mw including 10 normal water reactors with an output of more than 300 Mw are in operation, and 16 nuclear power plants to generate 18.803 Mw are under construction or on order but without construction permits.

Nuclear energy generated 14% of the electricity produced by utilities in 1979. Public opinion regarding the peaceful use of nuclear energy, having reached a low after the accident at the Three Mile Island nuclear plant, has in the meantime improved to the extent that the number of proponents in the Federal Republic has increased markedly, according to surveys. Even an intent to purchase a nuclear power plant was booked in 1980 and a second is expected by the end of the year.

A commission of parliamentarians and scientists, appointed at the behest of the German parliament, the Bundestag, which was to study the further expansion of nuclear energy, presented its report in June 1980. The commission, also including opponents of nuclear energy, concurred that no way had been found as yet to dispense with nuclear energy in the supply of electricity.

The evident change in attitude has of course a number of reasons. Perhaps it could be that the memories of the accident at the Three Mile Island nuclear plant are fading, particularly since it is becoming steadily more apparent that neither the population nor the environment in the area suffered real damage. In addition, our fellow citizens, subjected to rising prices for gas and in particular heating oil, are learning the value of thrift in using these energy sources and are recognizing at the same time how important a secure, inexpensive energy supply can be. Almost daily they read newspaper and TV reports of political unrest in the Middle East which leaves them with no alternative than to deliberate about a substitute for oil.

The Federal Republic of Germany is only able to cover about 40% of primary energy needs out of its own resources (bituminous coal 22%, lignite 9%, oil and natural gas 8%). Foreign supplies provide the remaining 60%, with oil accounting for 50%, natural gas 10%, bituminous coal 1%.

The kilowatt hours produced by utilities in 1979 were derived from hydro power (5%), lignite (31%), bituminous coal (25%), oil (5%) and natural gas (20%); nuclear energy held a 14% share.

More than 90% of the lignite mined in Germany fuels electric utilities. It is hardly possible to increase output since some of the mines now in operation are close to depletion and the new large finds, now being developed, will only serve to replace the depleting volume but will not suffice to provide additional fuel.

It is unlikely that coal production can be increased annually in excess of efficiency gains since the deposits, although plentiful, can only be mined at greater and greater depths. Production costs, already very high, would increase further. In addition,

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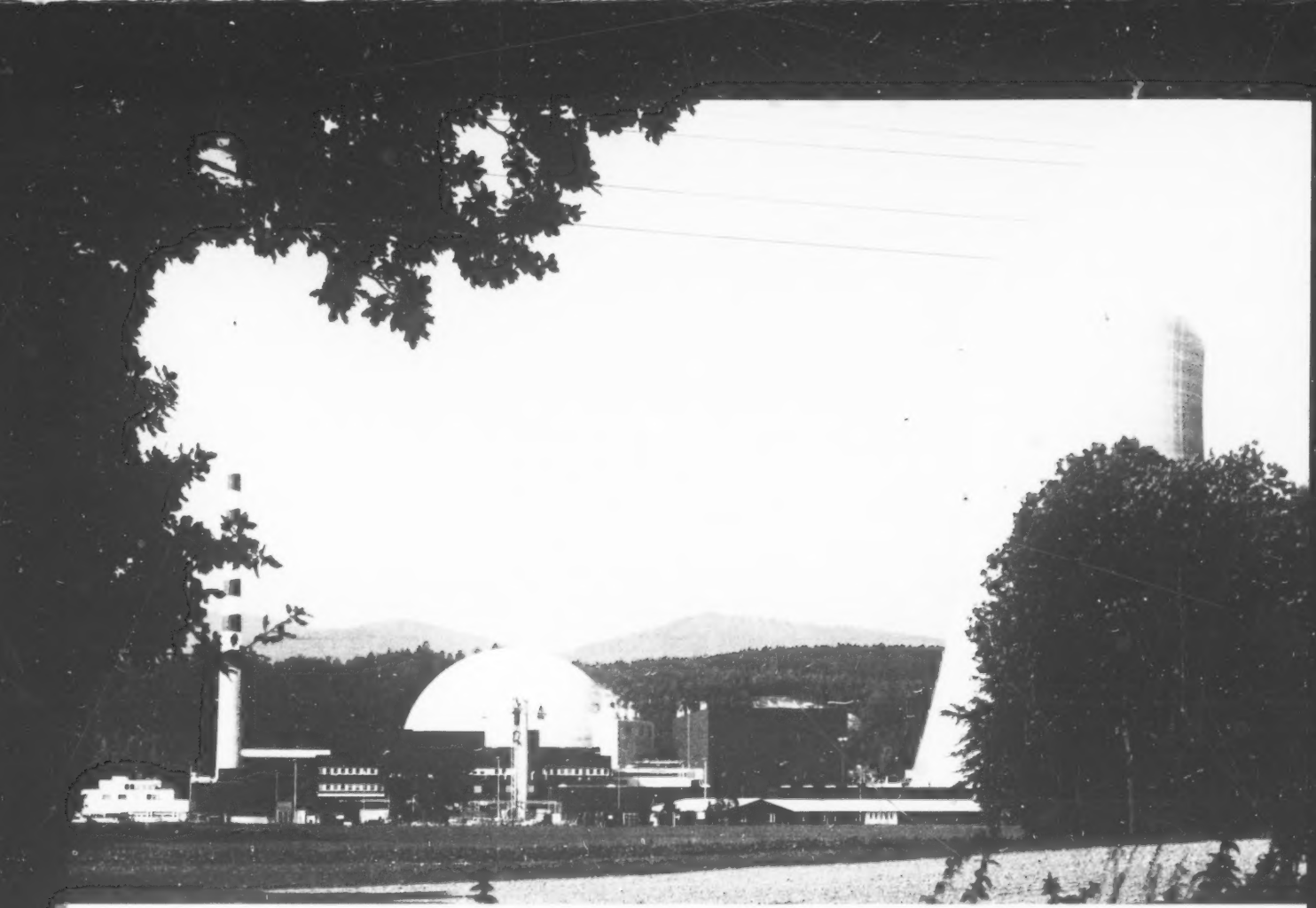
experience shows that the public not only opposes new shafts but they also result in yet higher cost levels. Germany has only very limited oil and gas resources. In the long run they will be depleted.

Taking everything into account, it is clear that we cannot do without nuclear energy. For this reason projections of future consumption include nuclear energy. For 1990 an additional installed capacity of about 20,000 Mw will be required. This need can be met if all plants under construction or ordered are supplying power by that time. Between 1990 and 1995, as much generating capacity has to be made available through new construction if the supply is to cover the demand.

The German bituminous coal mine operators and utilities have concluded an agreement providing annually 47 million metric tons of domestic coal for generating power, or about 15 million metric tons more per year than is currently being fired in the utilities' boilers. It is also sought to take a larger number of antiquated power plants out of commission and to replace them with new efficient installations which, because they will be equipped with fly ash precipitators and desulfurization equipment, will prove to be less of a burden on the atmosphere than the decommissioned plants. Altogether, this substitution process involves plants that are expected to start generating a total of 20,000 to 25,000 Mw in the Eighties. It is anticipated that it will be politically feasible to keep these plants on approval and construction schedules that are shorter and thus almost normal.

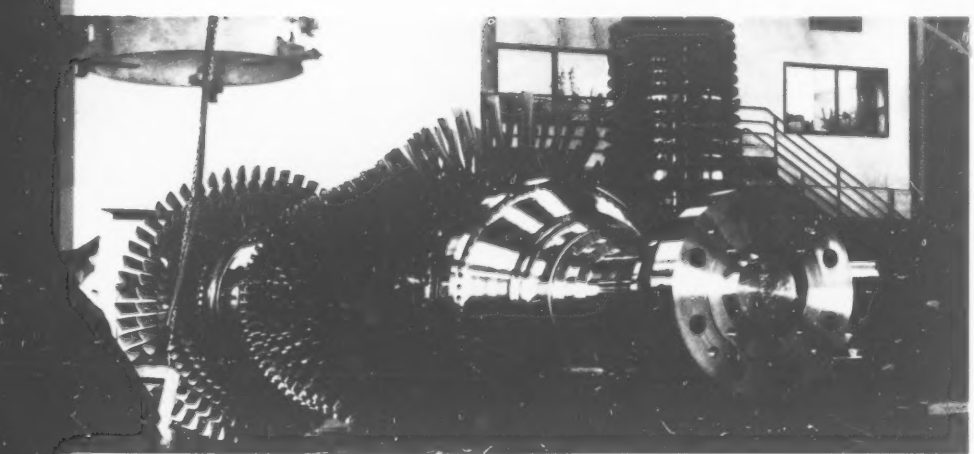
But the price of all this is considerably higher costs per KWh than would have been generated by nuclear power plants. However, it is held that this price has to be paid in order to make the path for nuclear energy more secure. It is that nuclear energy will carry the entire basic load in the Nineties and also more of the added load so that the mixture will result in electric rates that will increase in the Eighties, but perhaps stabilize in the Nineties. A comparison of generating costs of two plants recently commissioned in

"... the cost per KWh of the plant fueled by bituminous coal to be DM 0.05 higher than the KWh cost of the nuclear power plants."

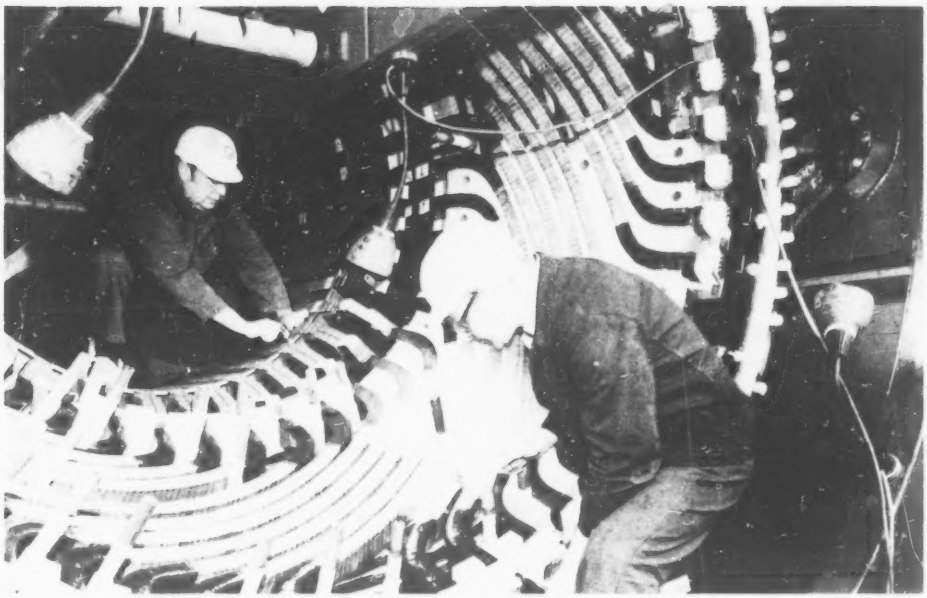


the Federal Republic shows the cost per KWh of the plant fueled by bituminous coal to be DM 0.05 higher than the KWh cost of the nuclear power plant. For large nuclear facilities that represents after all DM 400 million per year.

It is to be assumed that the boards of directors of German utilities will insist on building nuclear power plants in spite of all hurdles put in the way of these facilities. Their determination is based not only on the per KWh cost advantage of nuclear power and their awareness of their responsibility to supply the economy energy at lowest cost, but also on the reflection of the fact that nuclear power plants built in Germany have proved to be extremely safe and that in addition the Federal Republic also possesses the facilities required for the production of fuel and fuel rods as well as for the processing of spent fuel—the latter still on a pilot plant scale. Only uranium ore and yellow cake and the enrichment are imported. Now the opportunity appears to be at hand to perform the enrichment ourselves. Because the centrifugal enrichment process which, like the diffusion process, is based on uranium hexafluoride has in the meantime been developed, in co-operation between Great Britain, the Netherlands and the Federal Republic, to such a level, a large prototype installation is operating satisfactorily and the construction of a full scale plant is being seriously considered. The process consumes comparatively little energy.



The German nuclear industry is well equipped and positioned to deliver, build and start-up various types of nuclear plants. As mentioned earlier, normal water reactors with a high output predominate in the Federal Republic. Normal water reactors operating with boiling water or pressurized water as well as heavy water reactors have been built. Power plants with normal water reactors have also been shipped to



neighboring countries, i.e., to the Netherlands, Austria, Switzerland and Spain.

The heavy water type was developed in the Federal Republic from a 60 Mw prototype power plant with a pressurized water reactor moderated by heavy water and fueled by natural uranium. This plant was ordered in the early Sixties, at a time when it was not certain if and under what conditions enrichment would be available on world markets. The experience thus gained in this endeavor led to an order for a 340 Mw power plant (Atucha I) to be built in Argentina. It was followed by an order for a plant of the same type but with an output of 660 Mw. Both plants use natural uranium as a fuel.

We share the concerns of the U.S. government about the problems of proliferation even if there have been some differences of opinion in arriving at a consensus. Perhaps the U.S. has not always fully appreciated the difficulties that some European and developing countries face if they have to do without reprocessing facilities and breeder reactors in the long run. Nevertheless, it appears to be evident that the international conference (International Nuclear Fuel Cycle Evaluation) initiated by the U.S. government will lead to greater mutual understanding.

Currently a gas-cooled high-temperature reactor is being built as a prototype in the Federal Republic. It is rated at 300 Mw. Also under construction is a natrium-cooled fast breeder, developed jointly by Belgium, the Netherlands and Germany. It too is a prototype and rated at 300 Mw. Both prototypes should be operational by the mid-Eighties. Germany is, in addition, participating in the 1000 Mw Superphoenix breeder under construction in France. German involvement includes the supply of measuring and control instruments.

The German nuclear industry appears to be in a strong position to offer a comprehensive line of equipment. However, this picture is somewhat deceiving because the long drawn out fights with authorities and citizen groups have led to a feeling of resignation in some parts of the energy sector. To maintain its good reputation, the nuclear industry must regain its momentum, because, according to the old adage, "what rests, rusts". A British royal commission recently investigated the reliability and availability of nuclear power plants. The German installations were rated to be the best. It would be a shame if the opposition of environmentalists and the lack of decisiveness by the authorities succeeded in lowering the capabilities of the German nuclear industry. ■

DEUTSCHE ZUSAMMENFASSUNG

Der Verfasser stellt die bisherigen Leistungen und die Leistungsfaehigkeit der deutschen Kernkraftwerkindustrie vor. Er macht den Leser mit den Gruenden fuer die schon laenger andauernden Verzoegerungen beim Ausbau des Kernkraftanteils an der Stromversorgung der Bundesrepublik bekannt. Dazu gibt er Einblicke in die politischen und technischen Probleme, die bei einer verstaerkten, friedlichen Nutzung der Kernenergie zu loesen sind. Er macht darauf aufmerksam, dass bei einem weiteren Hinausschieben des noetigen Ausbaus der Atomstromkapazitaeten Versorgungsengpaesse auf uns zukommen werden, die, wenn ueberhaupt, nur durch sehr teure Kohlestromanlagen beseitigt werden koennten. Die Wettbewerbsfaehigkeit deutscher Kernkraftwerktechnologie, heute noch unbestritten, erfordert die staendige Herausforderung, um weiterhin Grundlage einer wichtigen Industrie fuer das eigene Land und fuer den Export bleiben zu koennen. "Wer rastet, der rostet," gilt auch fuer das teuer erkaufte und nun zur Verfuegung stehende, der Nutzung harrende deutsche Fachwissen im Bereich der Energieerzeugung mit Hilfe von Kernbrennstoffen.

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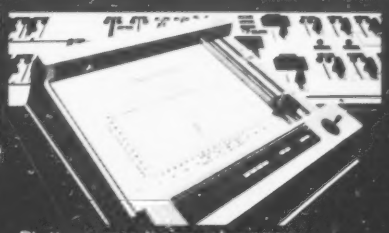

Plotter recording performance curve.

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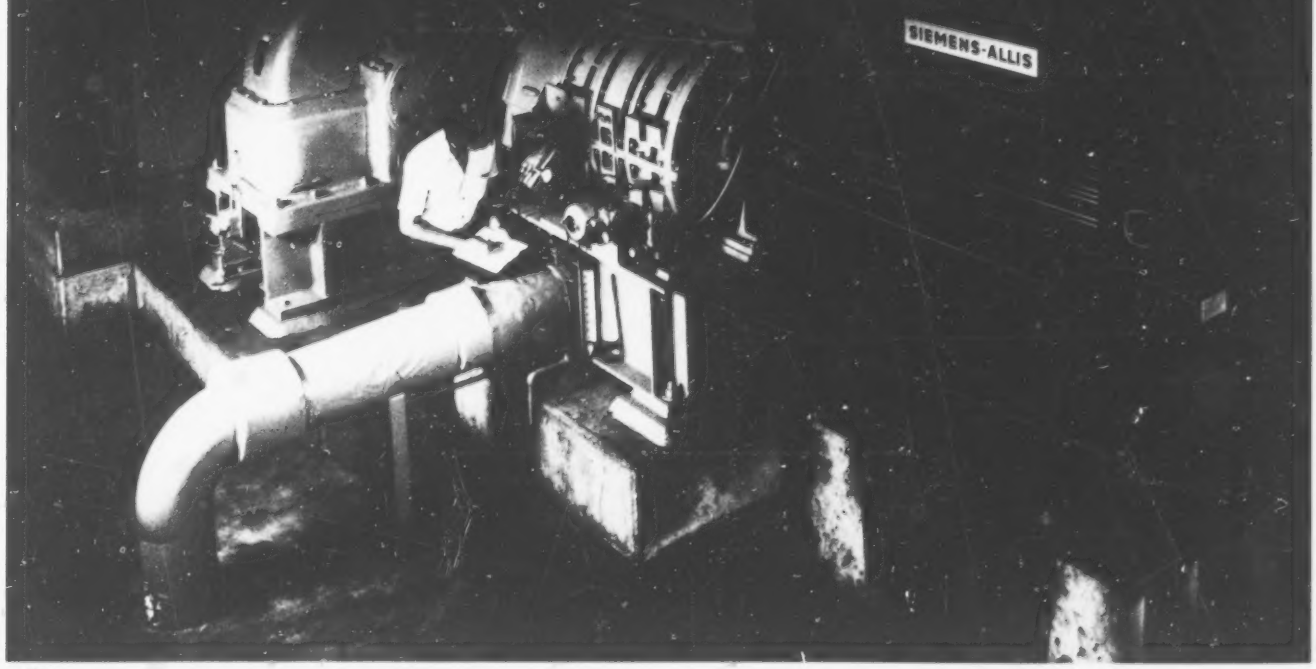


Gasohol: New Look at an Old Fuel

by Senator Birch Bayh

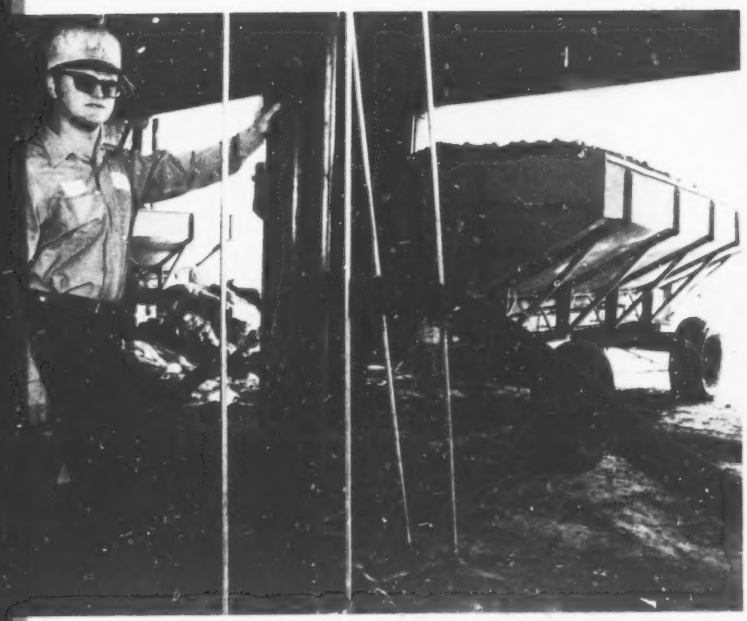
In the 1980's, we will witness the emergence of a variety of energy sources, and alcohol fuels will have a prominent place among them. Gasohol, the 10% blend of ethyl alcohol from grain with 90% gasoline, has led the way to popular acceptance, an achievement that few people would have predicted only two years ago. Production has risen from virtually nothing at that time to a current rate of approximately 120 million gallons of fuel alcohol annually. Considering the active support from many directions, the Presidential goal of 500 million gallons of capacity per year by the end of 1981 seems to be within reach. Projections of production in the billions of gallons by the end of the decade were unthinkable until recently, but are now deemed possible.

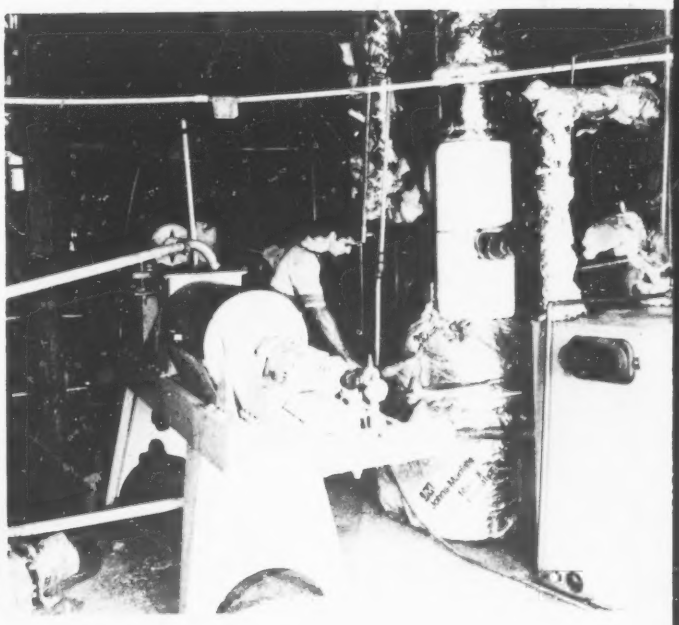
The emergence of this sizable new industry promises important benefits to offset the severe problems resulting from the spiraling cost of oil. Energy independence, new markets for American agriculture, new opportunities for employment, and the shift to renewable resources are the likely benefits of the developing fuel alcohol industry. Additionally, there is plenty of room not only for the large-scale producers who will be entering the market, but also for small-scale producers on farms across the country. This will introduce a healthy diversification into our energy industry. The trend toward alcohol fuels will draw upon an immense variety of resources—from idle farmland to forests, factory wastes, and city garbage dumps.

The Midwestern farmers who rode their gasohol-powered tractors to Washington in 1977 and told the nation about the potential for alcohol fuels were faced with stiff opposition at the time. The oil companies resisted the movement; the U.S. Department of Energy was unenthusiastic; and even the U.S. Department of Agriculture was not convinced that anything should be done. Now many of the oil companies are actively marketing gasohol, and one major oil company has more than 5000 outlets. The Departments of Energy and Agriculture have each received $525 million appropriations from the U.S. Congress under the Energy Security Act. These funds will support alcohol production during the next two years.

The other important piece of legislation encouraging alcohol fuels is the Windfall Profit Tax Act, which extends the exemption of gasohol from the 4 cents per gallon federal excise tax on gasoline until 1992. This exemption has helped both the consumer and the prospective producer.

The effort to accelerate the development of alcohol fuels, and the policy debates





affecting such development, have resulted in the establishment of the National Alcohol Fuels Commission. The Commission is composed of six Senators, six Congressmen, and seven public members. It is evaluating the major technical, financial, and policy-oriented factors affecting the future of alcohol fuels. The final report will be released in December of this year with recommendations, based on a comprehensive study of the best means available for further development of alcohol fuels.

As is the case with most new solutions for old problems there are those who argue against alcohol fuels. Many critics base their opposition on the concern that alcohol fuels derived from grains will displace the supply of grain available to feed the starving poor of the developing nations and inflate the price of food at home. A detailed study of the issue has led the Commission to conclude that this problem is overstated. Current and projected corn production and export levels will provide a margin sufficient to allow production of four billion gallons of ethanol annually, while maintaining a steady increase of exports and adding no more than one-half percent per year to the cost of food between now and 1990.

Furthermore, alcohol production uses up the starch in grains, but the protein is preserved. The high protein by-products of alcohol production, distiller's dried grains or corn gluten feed and meal, provide part of the food ration for cattle and other animals. The opportunity to produce both food and fuel go hand-in-hand.

The fact that alcohol fuels will be produced from a wide variety of feedstocks other than grains will further reduce the chance of conflict. The potential for use of non-food-related feedstocks is in fact greater than the presently heavy reliance on grains. It is estimated that 25% of the potato crop each year consists of "culls" (potatoes too spoiled to be edible), but they would be an excellent feedstock for alcohol. Municipal solid waste, crop wastes and residues, and forestry wastes, can yield billions of gallons of alcohol annually when the process for converting cellulose is feasible on a large scale.

Coal-derived methanol has enormous potential. The examples can be multiplied, but all of them point toward the increasingly diversified sources for alcohol that will not compete for food supplies.

The other controversy that the Commission has addressed is the issue of the net energy balance. It involves the question

"Modern plants designed to produce alcohol fuel are more efficient, and innovations to improve their efficiency are still being discovered."

of whether more energy is required to produce alcohol than is contained in the product itself. This argument was used originally to discredit gasohol, but the Commission has found that it ignores several important considerations and relies on outdated information. Critics have depended on energy balance analyses from distillers built years ago, when few efforts were made to conserve energy. Modern plants designed to produce alcohol fuel are more efficient, and innovations to improve their efficiency are still being discovered. Additionally, critics have focused on the sum of the energy used not only in the actual production of alcohol but in the energy needed to grow, harvest, and transport the crops to the plant. The different methods for arriving at the final tally have caused a lot of confusion—in which the more important points are forgotten.

Most importantly, there is no question that modern alcohol plants yield more liquid fuel than they consume. The government has discouraged the use of petroleum to produce alcohol, because it achieves no meaningful gain in the net supply of liquid fuel. Plants relying on coal or cogeneration contribute directly to the increase of this supply, and more innovative facilities will be able to take advantage of solar or other renewable energy sources in producing alcohol fuels. When it is noted that we tolerate a very low efficiency in the production of electricity from coal, in which 75% of the energy is lost in the conversion, then it becomes clearer that the real goal is the production of energy in a readily usable form. The new energy balance issue should be stated not in terms of efficiency but in terms of the increase of liquid fuel, and on this score the energy balance is certainly positive.

Under the Energy Security Act, the federal government is beginning to provide the first far-reaching financial support for the alcohol fuel industry. The Departments of Agriculture and Energy will be administering separate programs. The Department of Agriculture (USDA) will be involved in supporting projects of under 15,000,000 gallons annually. Exceptions to this will include USDA's responsibility for projects of any size owned and operated by farmer cooperatives. Where wood and wood wastes are used, USDA and DOE will decide which Department is the most appropriate source of funding. USDA can devote up to $175,000,000 of its $524,000,000 over the next two years to projects whose annual production capacity is not more than 1,000,000 gallons, such as small scale on-farm production.

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The federal government has provided a variety of approaches for financial support, including tax incentives, direct grants, loans, guaranteed loans, price guarantees, and purchase agreements. Additional support in the form of private loans and investments is also important, but there has been a reluctance on the part of banks and investment houses to make money available for the construction of alcohol plants until markets have been more positively proven. The banking community has adopted a "wait and see" policy toward the production technology and market potential of alcohol fuels. The problem was intensified earlier in the year by the extremely high interest rates. Nonetheless, we expect to see the same change of attitude in the banking community that we have already seen in the oil companies and the government.

One of the most important ways that the alcohol industry will attract more investment is through the emergence of a fully competitive market for ethanol and methanol. The demand for gasohol has greatly exceeded its supply, and prices at present are not accurately reflecting the cost of production. By the time that several dozen producers have entered the market and begun to catch up with the demand, prices should stabilize. OPEC's continuous price hikes and further turmoil in the Middle East will result in constantly higher prices for gasoline. Both the competition among alcohol fuel producers and more expensive gasoline ought to make gasohol even more popular than it has already become. Furthermore, the development of a widespread production network for alcohol fuels will further help to reduce the costs involved in the distribution of alcohol.

"The demand for gasohol has greatly exceeded its supply."

The future for methanol also appears to be good. Methanol from coal is much cheaper than gasoline. The high cost of the plants—a billion dollars or more—has delayed their development, but the need for America to reduce its dependence on imported oil will make methanol more and more attractive. Other processes for obtaining alcohol fuel from factory or urban wastes are also becoming commercially competitive. In short, alcohol fuels will be available from many sources at an affordable price, and they represent a valuable defense against our dependence on OPEC

One means of rapidly increasing the production of alcohol is to convert existing idle capacity in distilleries, breweries, and other plants. This can result in as much as 450 million gallons of additional production capacity from this area alone by the end of 1981. Combined with present production and new plants coming on line, this would boost production well beyond the 500 million gallon goal set by the President. The conversions would involve retrofitting these idle plants and the dual use of active distilleries to produce both beverage and fuel alcohol. A good example is the decision by Schenley Distillers Inc. to retrofit a distillery in Lawrenceburg, Indiana to produce fuel alcohol.

Another important boost for alcohol will result from perfecting the technique for converting cellulose to alcohol. This will open up the way for use of wood and wood wastes as well as urban wastes. This breakthrough is expected within the next three to five years, and advanced research is already underway at several centers around the country. Sulfuric acid or enzymes from microscopic fungus organisms will break down cellulose into fermentable sugars. Urban wastes, which are 50% paper, will be a leading feedstock. It is likely that the breakthrough will encourage the development of "energy plantations," large farms on which fast-growing trees will produce abundant material for conversion. Genetic work to increase the rate of growth and the starch content for fermentations is also underway.

Alcohol fuels are now a recognized part of the energy mix that will eventually free the United States from its dependence on precarious and expensive supplies of overseas oil. Their future is extremely promising. They will bring together a lot of Americans from the most diverse areas—cities and farms, automobile manufacturers and experts in genetics, the little guy and the oil companies. Each will make a contribution to the development of this new and important American industry. ■

DEUTSCHE ZUSAMMENFASSUNG

In den achtziger Jahren wird es eine Anzahl neuer Energiequellen geben, unter denen alkoholische Treibstoffe einen bedeutenden Platz einnehmen werden. Der Verfasser beschreibt die Erwartungen, die in den USA in die Technologie der alkoholischen Treibstoffe gesetzt werden. Ihren Ausdruck finden diese Erwartungen in der Bildung der hochrangigen National Alcohol Fuels Commission bei der Regierung in Washington. In den Mittelpunkt seiner Betrachtung stellt der Verfasser das schon jetzt zunehmend verwendete "Gasohol", einen Verschnitt aus 10% Aethyl-Alkohol und 90% Benzin. 1981/82 soll dieses Gemisch schon in einer Menge von 500 Millionen Gallonen (1 Gallone=3,785 Liter) pro Jahr hergestellt und verbraucht werden. "Gasohol" hat den Vorteil, dass seine Produktion nicht nur in grossen Dimensionen rentabel ist, sondern auch von Kleinproduzenten gewinnbringend hergestellt werden kann. Es besteht auch die Moeglichkeit, alte Branntweinbrennereien zur Herstellung von Alkohol fuer "Gasohol" umzuruesten und damit eine Reihe neuer Existenzen zu schaffen. 1977 wurde dieser neuen Entwicklung noch keinerlei Beachtung geschenkt. Heute hat eine grosse Oelgesellschaft in den USA bereits 5000 Tankstellen, die "Gasohol" fuehren. Der US-Kongress stellte dem Energie- und dem Landwirtschaftsministerium je $525 Milliarden zur Erforschung und Subvention der Produktion von "Gasohol" zur Verfuegung. Ein starker Anreiz zur "Gasohol"—Produktion wurde durch eine Verbrauchssteuerfreiheit bis 1992 geschaffen. Die Gegner der "Gasohol"—Herstellung fuehren an, dass das zur Herstellung des benoetigten Alkohols neben anderen pflanzlichen Stoffen verwendete Getreide damit nicht mehr Ernaehrungszwecken zur Verfuegung stehe. Dem steht jedoch entgegen, dass es noch ausreichend Brachland in USA gibt, das speziell zum Anbau von Alkoholgrundstoffen bearbeitet werden kann. Im Laufe der nahen Zukunft wird es auch moeglich sein, den Alkohol aus anderen Grundstoffen als Getreide zu gewinnen, so z.B. aus Holzabfaellen, Ernteabfaellen und auch aus papierhaltigem (Zellulose) Muell. Noch sind die Banken skeptisch, die neue Technologie zu finanzieren.

Ein gewisses Problem bei der Alkoholherstellung fuer Treibstoffzwecke aus pflanzlichen Stoffen stellt die Energie dar, die erst einmal eingesetzt werden muss, um die Pflanzen bis zur Ernte und sodann zur Verarbeitungsstaette zu bringen. Aber nach angestellten Berechnungen ueberwiegt der Nutzen. Nach einer gewissen Anlaufzeit wird sich der Preis fuer "Gasohol" stabilisieren und unter dem Preis fuer Benzin liegen. Der Autor geht in seiner Darstellung auch auf die amerikanischen Anstrengungen zum vermehrten Einsatz von Methanol und Ethanol ein. Er legt dar, dass das vom US-Praesidenten fuer Ende 1981 vorgegebene Produktionsziel von 500 Millionen Gallonen Treibstoff auf pflanzlich-alkoholischer Basis mit grosser Wahrscheinlichkeit weit uebertroffen wird.

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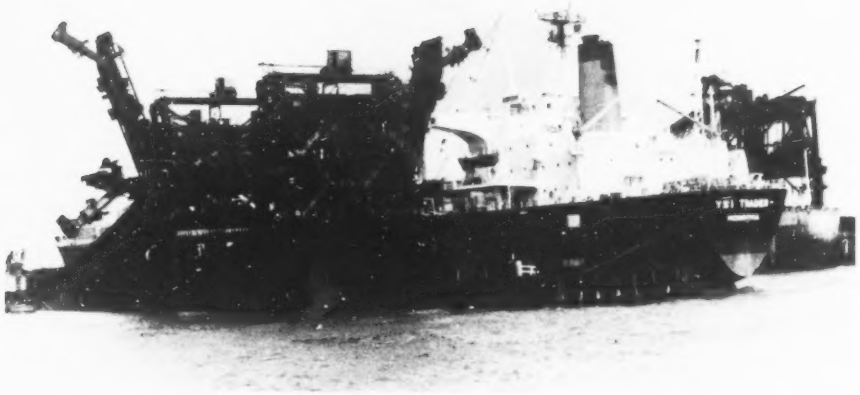


Shipping U.S. Coal Overseas

by Virginia Port Authority

The problem the U.S. faces in expanding its coal exports is akin to the "chicken before the egg" riddle, then Deputy Energy Secretary John C. Sawhill told the Senate Energy Committee in September. On the one hand, many potential foreign buyers insist that new investments to improve the U.S. transportation infrastructure be made before agreeing to sign long-term purchase contracts. On the other, coal port operators demand long-term contracts as a condition for making significant capital investments.

It is up to the federal government to "break the egg", said Mr. Sawhill, by taking actions to enhance U.S. participation in growing international coal trade. Nevertheless, "the private sector can be expected to respond aggressively to the anticipated increase in global coal demand," he added, which by 1985 could grow to between 105 million and 150 million tons annually for steam coal alone.

Committed to development of Virginia's maritime industry, the Virginia Port Authority is taking an active role in assessing the coal situation and seeking methods to meet the demands. Industry executives and political leaders are taking steps to smooth coal export traffic in Hampton Roads. Major improvements are already underway and several others are on the horizon.

Glenn Sedam is determined to get down to specifics on the coal situation. Chairman of the VPA Board of Commissioners, Sedam is working closely with Virginia Governor John Dalton and coal industry representatives to "get the facts straight and get the situation in perspective." Once a good analysis of existing capacities and needs is made, "we can find solutions to meet those needs," says Sedam.

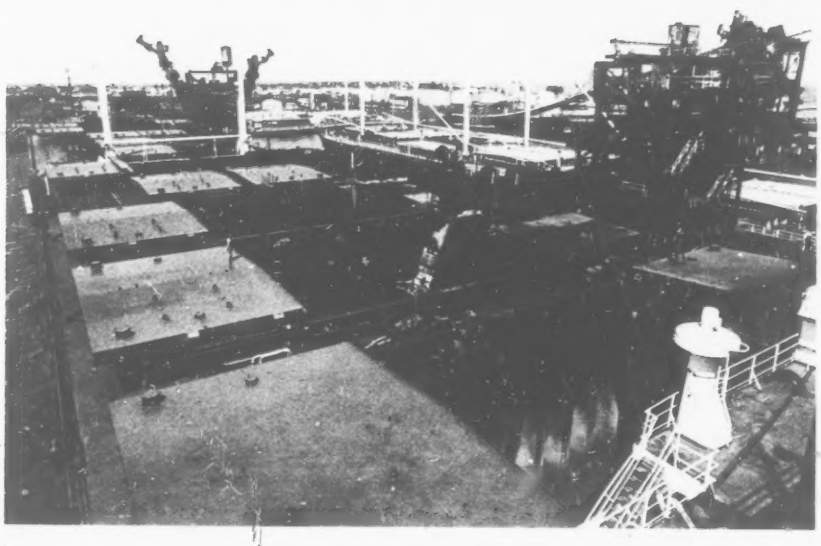
The VPA does not own any coal facilities, nor is it directly involved in the coal industry. The authority's primary goal is to stimulate general cargo through marine terminals operating on state-owned land. But the clamor for coal from abroad and communication with Gov. Dalton has increased Sedam's determination to "protect business through the port." If it takes organizing a meeting of the nation's leading coal officials, Sedam does that—did that, as a matter of fact, in late August.

After several meetings with Gov. Dalton and talks with leaders in the coal industry, Sedam arranged for a joint meeting of the coal representatives in Norfolk. The meeting focused on the specifics of the coal situation—estimates of future needs, possible sites for expansion of facilities and financial alternatives.

The VPA's ability to issue bonds was one of the discussion items on the agenda,

Port of Hampton Roads
Coal Exports-1979-Top Five Customers
(Short Tons of 2,000 lbs.)

Country of Destination	*Tonnage*
Japan	9,349,426
Italy	4,835,789
France	3,419,282
Brazil	2,540,506
West Germany	2,123,022
Netherlands	1,848,763



although both Dalton and the VPA have stated a preference for financial solutions through the industry itself. The coal industry's response to VPA interest has been positive, says Sedam. "These people want to get the job done." With heavy demand for coal coming particularly from Europe and Japan, coal executives have been seeking ways to increase Hampton Roads' export capacity.

The increased demand for steam coal, in addition to metallurgical coal, which is presently the major type exported, has caused the search for expansion facilities. Storage facilities for steam coal are a priority in future planning. The VPA has provided considerable information to Gov. Dalton to aid in decision-making on coal issues. The VPA is also studying possible expansion sites and financing alternatives as well as providing information to coal producers upon request.

The Brussels office of the VPA is keeping the European coal community informed about the governor's coal meetings and recent progress in the coal situation. "We have been assuring coal buyers and users in Europe that we perceive the seriousness of this problem and we are working to meet their demands," said Sedam. "We will do everything we can to support the governor in his effort to find solutions and we are going to be very active and aggressive in keeping the coal business in Hampton Roads," said Sedam. "Virginia ports are the most economical and most appropriate ports for coal exports and we intend to keep our position as the nation's major facility for coal exports." Hampton Roads presently exports 80 percent of the nation's coal.

Expansion of coal facilities underway

Improvements of present coal export and storage facilities have moved steadily forward this year. Pier upgrading, dredging and land purchases for expanded facilities have taken place. Plans for deepening Hampton Roads harbor and major expansion blueprints by the coal and railroad industries promise increased coal facilities for Virginia ports.

A major breakthrough in the move toward expanded coal facilities came with the announcement by the A.T. Massey Coal Co. of Richmond that it would construct a transshipment facility at Newport News Marine Terminal. Massey signed an agreement in principle with Chessie for the purchase of Pier 9 (an unused ore pier) and 60 acres of land surrounding it. In the July announcement, Massey said that the modern facility will be able to handle 9.5 million tons per year and could be expanded to a 15 million ton annual capacity. Steam and metallurgical coal will be handled at the

facility. Construction is set to begin early next year, with a target date for operation set for 1982.

To increase loading capacity at Newport News Marine Terminal, the Chessie System put Pier 15 back into service in August. It will join Pier 14 in working overtime loading coal freighters. Chessie is also planning to take some of its tracks out and make more land available for coal storage, according to Jerry E. Gobrecht, vice president for coal traffic.

Norfolk & Western Railroad recently completed maintenance dredging at its coal facilities, Piers 5 and 6. The main facility, Pier 6, is maintained at a depth of 46.5 feet to accomodate larger vessels. Pier 5 is maintained at 36 feet. N & W has initiated a project to extend thawing sheds for frozen coal to be completed later this autumn. Track improvements in the yard are underway, as well as continuing evaluation of all parts of the operation.

Plans to deepen the harbor from 45 to 55 feet have long been on the drawing board, but environmental factors and the location of a dump site for dredge spoils have stalled the project. Virginia Fourth District Congressman Robert Daniel introduced legislation , in August, that would allow the spoils to be dumped in the Atlantic Ocean. If the bill passes and ocean dumping is approved by the U.S. Environmental Protection Agency, the last environmental hurdle would be removed.

Virginia Senator John Warner introduced a plan to deepen the channel within three years at an August meeting of the Virginia Coal Council. The $298 million dredging project would enable the port to handle "super colliers," but the plan requires congressional approval.

Construction of major coal facility

The Virginia Port Authority has proposed the construction of a major coal facility in Portsmouth, Virginia that would enable the port of Hampton Roads to maintain its leading role in supplying the world demand for coal. The coal facility would be operated jointly by several major coal companies and could be in operation in about three years, according to an outline of the plan presented by Glenn J. Sedam. Governor John Dalton immediately endorsed the plan.

In a meeting with representatives of six major coal companies and state officials at VPA headquarters on August 26, Sedam proposed the use of a 300-acre site on the 2,500 acre Craney Island, which is presently used by the U.S. Army Corps of Engineers as a disposal for dredge spoils from the port channels. "We have been in contact with the Corps and the federal government and don't anticipate any problems in acquiring the land," said Sedam.

The proposed modern coal facility would have the potential of expanding to ship up to 50 million tons of coal annually and would cost $80 to $120 million, depending on its coal handling capacity. Coal executives are expected to confer with their firms on the plan and respond to Sedam by the end of the year.

Several financing alternatives are under consideration. One possibility is that the state could issue bonds to finance the project. If that form is utilized, the state would own the land and the firms would be likely to enter into long-term leases with the state. If the coal companies make long-term commitments and the land can be obtained, a request for funds could be made to the Virginia General Assembly in January.

Coal companies represented at the VPA meeting were A.T. Massey of Richmond, Virginia; Pittston Coal Export Co. of Greenwich, Connecticut; Island Creek Coal Sales Co. of Lexington, Kentucky; Consolidation Coal Co. of Pittsburgh, Pennsylvania; Westmoreland Coal Co. of Philadelphia, Pennsylvania; and United Coal Co. of Bristol, Virginia.

Gov. Dalton, the VPA, Virginia Senator John Warner and state officials are urging the deepening of the Hampton Roads channel from 45 to 55 feet to accomodate larger coal ships. Warner will introduce to Congress in October a $300 million proposal for the Hampton Roads dredging.

Last year, 34 million tons of coal were exported through Hampton Roads. Total U.S. exports were 45 million tons. This year, 45 million tons of coal are expected to be exported through Hampton Roads. U.S. coal exports are expected to reach 60 million tons in 1980. ■

DEUTSCHE ZUSAMMENFASSUNG

Der US-Bundesstaat Virginia, ueber dessen Hafenanlagen, insbesondere in Hampton Roads, heute 90% der amerikanischen Kohleexporte laufen, bereitet sich auf eine Renaissance des Kohlezeitalters vor. Der Bundesstaat will weiter der Hauptumschlagplatz fuer die Kohleverschiffungen von den USA aus bleiben. Die Virginia Port Authority (VPA), die Hafenverwaltung Virginias, unternimmt, unterstuetzt vom Gouverneur des Bundesstaates, seit geraumer Zeit erhebliche Anstrengungen, um ein Schritthalten der Haefen Virginias mit der sich abzeichnenden rasanten Entwicklung der Kohleexporte zu garantieren und damit einen der sich abzeichnenden Engpaesse auf dem Transportweg der Kohle von der Grube zum Verbraucher gar nicht erst spuerbar werden zu lassen.

Die USA haben 1979 45 Millionen Tonnen Kohle ausgefuehrt, davon 35 Millionen ueber Hampton Roads. Im laufenden Jahr sollen es 60 Millionen Tonnen werden; 45 Millionen Tonnen sollen ihren Weg ueber Hampton Roads nehmen. Schon jetzt gibt es daher eine Reihe von begonnenen Projekten zur Ausweitung der vorhandenen Kohleverladekapazitaeten in Hampton Roads. Land zur Lagerung der Exportkohle wird angekauft, Piers werden ausgebaut bzw. wieder betriebsbereit gemacht, Hafenbecken werden ausgebaggert und vertieft. Die Hafenbehoerde prueft darueber hinaus den Bau einer neuen Kohleverladeanlage mit einer Kapazitaet von 50 Millionen Jahrestonnen in Portsmouth. Diese neue Anlage koennte schon in drei Jahren betriebsbereit sein.

Besondere Sorgen bereitet bei diesen Projekten nur der Umweltschutz. Wohin mit dem Baggeraushub aus den Hafenbecken? Eine Sondergenehmigung zur Versenkung des Aushubs auf offener See vor der Kueste Virginias ist beantragt.

Die Finanzierung der Erweiterungsprojekte wird dagegen angesichts des lebhaften Interesses amerikanischer Kohlehandelsfirmen an einer langfristigen Zusammenarbeit mit der Hafenbehoerde als wenig problematisch angesehen. Ist die Betriebsbereitschaft von Kohleverladeeinrichtungen erst einmal gesichert, so vertraut die Hafenbehoerde, dann wird es auch zu langfristigen Liefervertraegen fuer amerikanische Exportkohle kein weiter Weg mehr sein.

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Airline Traffic and Technology

Deregulation and International Air Competition

by Prof. Guenter O. Eser
Member of the Executive Board,
Deutsche Lufthansa AG

Under President Carter the regulations covering national air transport and subsequently international traffic have been subjected to considerable changes. Alfred Kahn, the former chairman of the CAB, was intent to bring the market forces of open competition into balance. It is the aim of this policy of liberalization to create a broader spectrum of flight services at more advantageous prices.

On the assumption that "free competition" helps to create an intra-American air transportation pattern that offers more advantages to the U.S. economy than could be realized under the heretofore regulated system, the U.S. government is now also intent to impose free competition on international routes.

Mr. Kahn described the hoped-for results as follows: "They predict that the free play of market forces will maximize carrier efficiency and reward responsive carriers, reduce fares in line with the costs of the most efficient carriers, thus benefiting consumers and increasing traffic, and organize international aviation traffic flows to ensure high load factors and efficient use of resources." That means less expensive air travel for the consumer as a result of competition and improved earnings for the carriers as a result of the optimal utilization of their capacities.

How has increased competition affected international competition? Deregulation represents the political efforts aimed at achieving the most liberal treatment of air transportation possible. Theoretically that means that:

- each airline of a country can fly to any location in the other nation and vice versa;
- each airline can set its own prices;
- each airline can determine its service-frequency and capacity as it sees fit; and
- the respective regulating authorities merely function to prevent discrimination or ruination in the competition.

> ***"Deregulation represents the political efforts aimed at achieving the most liberal treatment of air transportation possible."***

The international air service with the U.S. is covered by the following liberal air transport agreements:

- The U.S.-Dutch treaty provides for pricing by the country of origin rules but not

at the cost of ruinous or discriminating competition. An open sky policy is not practiced between the two countries.

- The U.S.-Israeli treaty provides for mutual disagreement in respect to fares in service between these countries and can be applied as well—at least in theory—to third countries, insofar as these also operate under a similar pricing provision. Open sky is not put into effect as yet.
- The U.S.-German treaty contains the country of origin pricing rules but also still a limitation in regard to cities that may be served.
- Altogether it is evident that, in contrast to domestic U.S. service, only the first steps toward the realization of greater competition have been taken in international service. Since liberalization has not reached the same degree in the two countries, it suffices at this point to confine the examination of the consequences of increased competition on the basis of German-American conditions. Even if, as already mentioned, a full liberalization has not been realized, some of these consequences are already becoming all too evident.

Impact on German-American air service

The protocol, appe[illegible]ed to the bilateral treaty between th[illegible] States and the Federal Republic o[illegible] into effect on November 1, 1978. It expands on the liberal elements of the 1955 treaty (multiple designation and 5th Freedom), and introduces the principle of country of origin rules for fares charged in scheduled service and conditions under which charters may be flown. It also deals comprehensively with rights granted under the 5th Freedom* to companies of both countries and allows for a considerable expansion of traffic-related properties by German companies in the United States.

On the basis of the protocol, the U.S. has designated Braniff, Delta Airlines, Northwest Orient, TransAmerican and Capital as new carriers across the North Atlantic and replaced in a second step the conventional charter conditions in force until then with so-called public charters. This has led the former supplemental carriers to convert to scheduled service.

Lufthansa took advantage of the new opportunities to expand its network in the U.S. by inaugurating service to Miami and San Francisco (1979) as well as Atlanta and Dallas (1980).

Thus, a substantial expansion in service overall has been introduced since the German-American protocol took effect. The greater competition has proved at first to be advantageous to the consumer. He could fly

**5th Freedom: The right to load and unload commercial cargo to/from a country other than the country of origin.*

more directly and at less cost. The airlines, too, benefit insofar as they can cover the market better and can sell their remaining capacities extremely advantageously.

In 1979, airlines carried 18.4 million passengers between the U.S. and Europe. This represents nearly 40% of the total border-crossing traffic of the United States. Compared to 1978, the traffic was greater by 1 million passengers or 5.7%. Scheduled service increased by 15.7%, while charters declined a decisive 31.4%. It was a trend that began in 1978 and continues to be evident.

The changed pattern is attributable to the no-holds-barred competition that developed in scheduled service at the expense of others. The reduction in scheduled service fares assumed such proportions that the charter traffic lost large market shares. While Kahn was hoping that lower prices would create new and greater market potential, all that happened actually was that most of the existing potential was diverted to scheduled service.

It cannot be denied that liberalization has at least provided scheduled service with more traffic. However, this increase must be weighed against the fact that a number of former charter carriers switched on the basis of the new market conditions also to scheduled service and thus represented added competition to the established scheduled carriers.

In accordance with the origin country rules, fares from the Federal Republic are set uniformly for all airlines by the Federal Ministry of Transportation. U.S. fares are subject to approval of the CAB and may vary from carrier to carrier. In effect, the multilateral fare system has ceased to exist in traffic with the United States and the multilateral system governing conditions of service has largely been eliminated.

It led to lower prices, or made it at least easier to introduce reduced fares, and thereby contributed on the one hand to a switch in demand from charter to scheduled service and, on the other hand, also helped to produce added traffic. For its part, Lufthansa succeeded at the same time in raising its business in full-fare paying passengers—in part due to the introduction of Business Class on January 1, 1979—and thus carried a passenger mix that produced a nearly unchanged income per passenger. By and large, analyses conducted internationally have shown that the average income per passenger dropped markedly and that the price competition spread rapidly to all segments of the passenger market.

Bottom line consequences

There is much debate about the economic consequences incurred by greater competition. It is evident that many companies operated profitably in 1978. In 1979, however, only a few—including Lufthansa—still managed to show a profit.

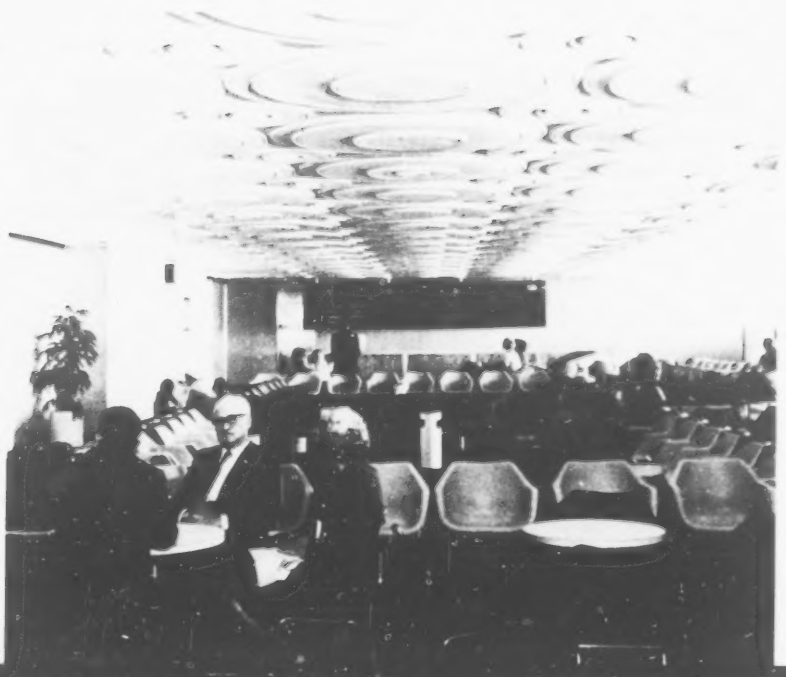
The 1978 profits were realized because it was still possible to sell, albeit at extremely low prices, the remaining seats that would have been empty on short notice. Since costs did not change significantly, the added income benefited profits.

In 1979, competition spurred the spread of price policies governing remaining seats to other segments of the passenger market and lowered income substantially. As a result, the profitability was reduced considerably and developed in some cases into a loss.

Assuming that the extremely low fares resulting from unbridled competition created added demand, then it follows that this demand will cease to exist when its basis, namely extremely low fares, disappears. If competition forces prices to levels that no longer suffice to cover costs, then it is only a matter of time until—in order to escape ruin—prices must be raised. As a result, demand will drop. It is therefore idle speculation to blame spiraling fuel costs alone as the reason that the short-term economic advantages of the 1978 liberalization policies were not realized again.

It had much more serious consequences: The higher utilization of capacities in 1978 and improved profits prompted many companies to plan for generous capacity expansions. A surplus of seats in the current year is faced with declining demand, without having the opportunity to create added demand through price incentives.

This predicament is a source of great concern for many European as well as



American companies. In the meantime the CAB also has throttled its expectations. Marvin Cohen, chairman of the CAB, considers it even possible that some of the larger air carriers may not survive. In view of the losses that a few carriers incurred in 1979 and in the current year so far, it is a severe but not unrealistic prophecy.

Conclusion and outlook

After almost two years of liberalization it is evident that free competition has not produced the anticipated results. Of course passengers benefit from a better choice of service. However, free competition also leads to the abandonment of economically marginal routes without regard to their importance to the national economy, so that in the final analysis the choice for passengers is actually narrowed.

Carriers can only be interested in building service if they also have the opportunity to operate such service profitably. It is not reasonable to assume that routes operated at a loss can be maintained in the long run unless, of course, they are subsidized by the government.

In the face of the losses experienced by the airline industry in recent quarters, it is

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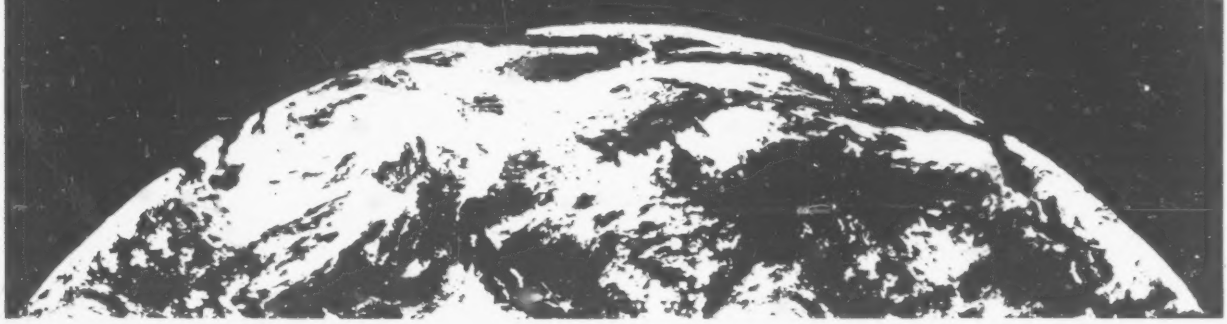

necessary to reconsider the current predicament. For that reason it seems doubtful that liberalization policies can be successful in the long run. Certainly the American government did not pursue liberalization in order to justify the goals of a free world economy. If that had been its intent, then the same government would not be concerned with considering measures that would bring the increasing pressure of Japanese automotive imports under control.

It is nevertheless regrettable that an industry must first get into economic difficulties in order to demonstrate that carriers must operate in a regulated climate if they are to fulfill their national and international obligations. ■

DEUTSCHE ZUSAMMENFASSUNG

Der Verfasser stellt in seinem Artikel die Ausgangslage, den Ablauf und die Folgen des verstaerkten Wettbewerbs im internationalen Luftverkehr dar, der mit einem Abbau amerikanischer Verwaltungsvorschriften (Deregulierung) vor etwa zwei Jahren eingeleitet wurde. Er kommt zu dem Ergebnis, dass der unbeschraenkte Wettbewerb im Luftverkehr die in ihn gesetzten Erwartungen nicht erfuellt hat und liefert gleichzeitig eine interessante Analyse der Gefahren, die einer Industrie drohen, der ein abstraktes, wirtschaftstheoretisches Denkmodell unterlegt wird. Fuer den Passagier ist der freie Wettbewerb zwar zunaechst von Vorteil. Der Konkurrenzkampf fuehrt zu sinkenden Flugpreisen. Dies fuehrt aber dazu, dass eine Reihe von Flugstrecken nicht kostendeckend bedient werden koennen. Die Einstellung des Linienverkehrs auf diesen Routen ist die Konsequenz. Letzten Endes ist der Passagier dann doch der Benachteiligte.

Bedingt durch den freien Wettbewerb im Linienverkehr und die damit fallenden Preise gingen immer mehr Chartergesellschaften zum Linienverkehr ueber. Das hat zu einer erheblichen Erweiterung des fuer die Fluggesellschaften teureren Linienangebots gefuehrt, ohne dass neue Passagiergruppen an den Markt herangefuehrt wurden. Die Folge davon war, dass der Durchschnittsertrag pro Passagier deutlich sank. Im Jahre 1978, dem Jahr der Freigabe der Flugpreise, machten noch viele Gesellschaften Gewinne. 1979 begann dagegen fuer viele der Flug in die Verlustzone. Es ist nur noch eine Frage der Zeit, bis die Fluggesellschaften ihre Preise wieder anheben muessen, um wieder kostendeckend arbeiten zu koennen. Dann wird die Zahl der Passagiere sich rueckbilden. Zusaetzlich geschaffene Kapazitaeten werden einer ruecklaeufigen Nachfrage gegenueberstehen. Diese Situation werden nicht alle Fluggesellschaften ueberstehen koennen. Es wird am Ende wohl weniger Wettbewerb geben als zu Beginn der Freigabe des Luftkampfes.

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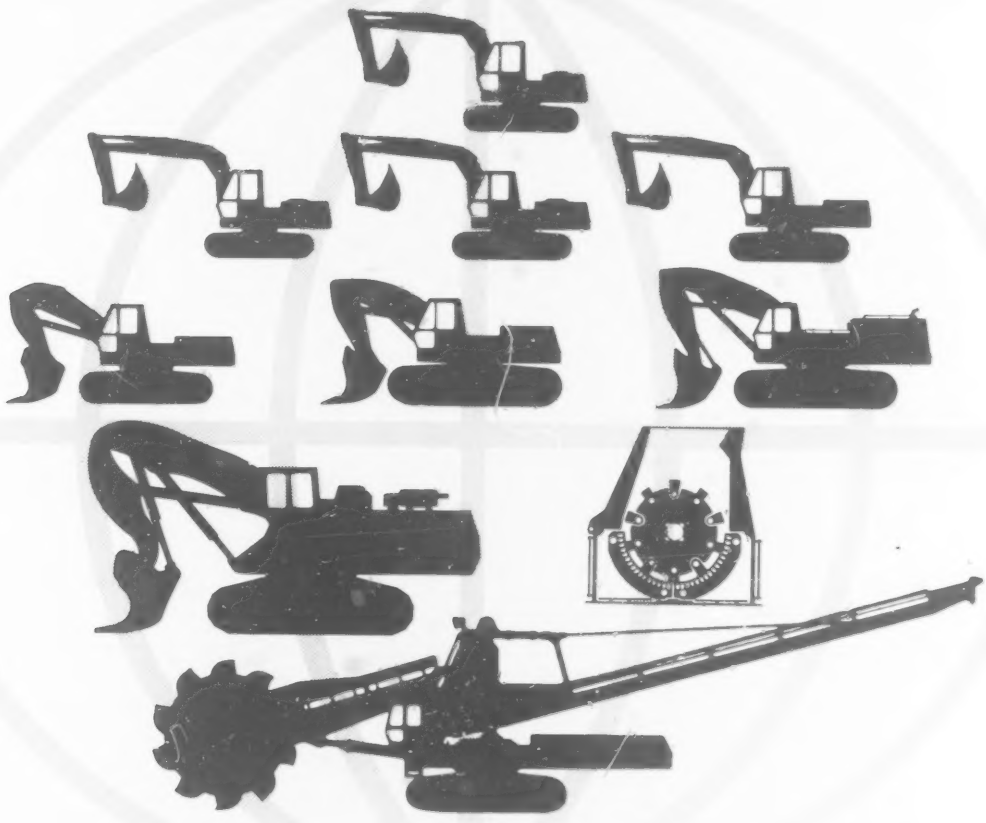

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U.S. Scheduled Air Transportation in the 1980's

by Daniel Z. Henkin
Vice President,
Air Transport Association of America

In 1980, for the first time in the many years that air transportation has been the major mode of overseas travel, travelers flying to the United States from other countries were reported to outnumber Americans flying abroad.

The traffic flow has been big in both directions. Based on results for the first three quarters of 1980, an estimated 19.7 million visitors from other countries will fly to the United States before the year is out and an estimated 18.9 million Americans will have flown to other countries.

The narrowing of the gap in the origin of air travel to and from the United States has been evident since 1972. In the intervening years, foreign citizen air travel to the United States has been increasing at an average annual rate of 9.4%. Air travel by U.S. citizens to other countries during these same years has been growing at an average annual rate of 3.3%.

Clearly, this trend poses a challenge to U.S. carriers to increase market share among the citizens of other countries flying to the United States. And the millions of new visitors to the continuing growth of tourism in America.

The shifting trend of international air travel illustrates an important point about modern air transportation.

Air transportation does not stand still. And the truism applies to far more than the jet speed of the service. It extends to the continuing quest for improved safety, reliability and convenience for passengers and shippers, even to the swiftly felt impact of major developments in the industry.

Predicting the future of air transportation—or the future of any other great enterprise, for that matter—can be hazardous. But I also believe that analysis of recent trends and developments with major impact upon the industry is one of the more reliable means of attempting to determine what lies ahead for U.S. scheduled air transportation in the decade of the 1980's.

"The narrowing of the gap in the origin of air travel to and from the United States has been evident since 1972."

I have selected for analysis the following five air transport-related developments:

- First, there is the impact of domestic airline deregulation in the United States.
- There is the enormous impact of drastic

changes in the availability and price of jet fuel.

- Then there is the traffic outlook, both short term and long term.
- There is the earnings picture, both in terms of earnings performance and earnings requirements.
- Finally, there are the questions of capacity of capital requirements.

Airline deregulation in the United States has been moving the industry from a 40-year regime of rigid economic regulation of rates and routes into a new climate governed more and more by the free forces of the marketplace.

Although our domestic air cargo operations have been deregulated for three years and passenger deregulation has been in process for two years, it is still too early for a definitive assessment. I make the last point because our first years of deregulatory experience have coincided with soaring fuel costs and the 1980 recession—developments that would have brought serious economic challenges to the industry, regardless of the regulatory climate.

A more meaningful analysis of how well deregulation works will have to await experience through a full economic cycle and experience through a hoped for period of less rapid escalation in the price of jet fuel. But a few points can be made.

Airline executives in the United States are pleased with the new flexibility deregulation has given them on routes and service and in other areas. They believe that this new flexibility has enabled them to respond more quickly and effectively to soaring fuel prices, recession and other challenges than would have been the case under the older, more strictly regulated regime.

There is a consensus among U.S. airline executives that deregulation has been moving at such a rapid pace during the last two years that the process should be accelerated by law, to be achieved earlier than the target dates contained in the Airline Deregulation Act of 1978. The U.S. Congress may hold hearings in 1981 on the question of accelerating deregulation.

Let's turn for a moment to fuel. Supply and price of fuel are the prime examples of challenges that would have had enormous impact upon airline operations, regardless of the regulatory climate.

Fuel availability, since late in 1973, has varied from periods of spot shortages, through periods of near industry-wide allocations imposed by suppliers, through the period of relatively good supply that has

marked most of 1980. Variations in supply may well characterize the jet fuel situation throughout the 1980's, particularly if there are world events having an adverse impact on petroleum production, transportation and refining.

Soaring fuel prices have become the major cost pressure for the airline industry. The average system-wide per-gallon price of jet fuel for U.S. airlines rose from 12 cents in mid-1973 to about 90 cents in mid-1980. And each penny rise in the price of a gallon of jet fuel increases the U.S. airlines' annual fuel bill by about $115 million.

Although the U.S. airlines are using less fuel in 1980 than in 1979, the industry's 1980 fuel bill is likely to be nearly $4 billion higher than a year earlier. Fortunately, the rate of increase in fuel costs slowed significantly in 1980. There is some evidence—certainly a hope—that the 1980's could see more stability in fuel prices. Again, however, such a forecast is subject to world events.

Turning to the traffic outlook, a clear distinction must be made between current performance and long-range outlook. This is true because the current market softness is in such contrast to the historic pattern of consistent growth and the projections for continued growth.

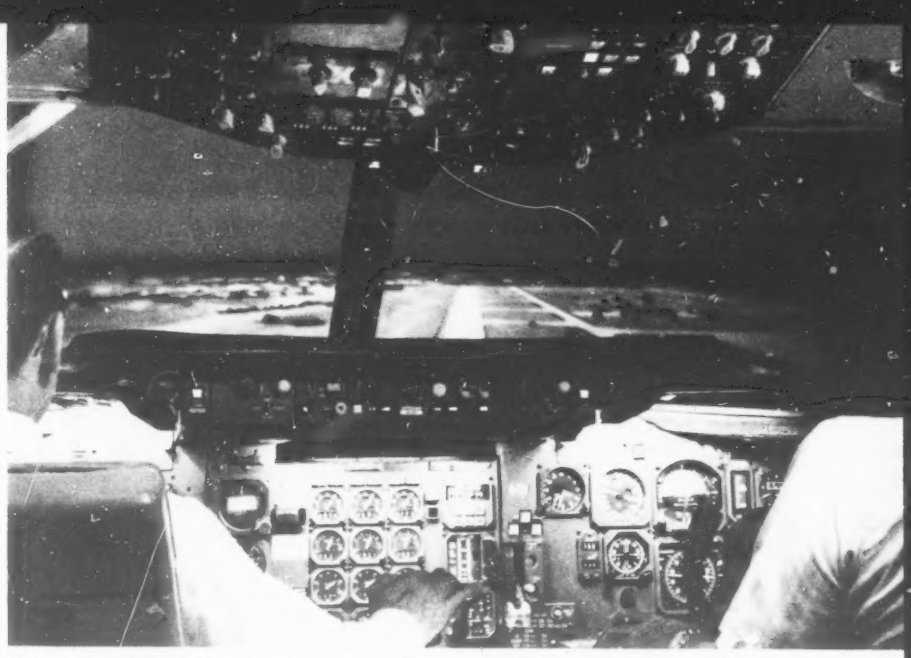
The U.S. airlines completed the last decade by carrying a record 317 million passengers in 1979 and accounting for 262 billion revenue passenger miles. This was 145 million more passengers than in 1969, and more than double the revenue passenger miles of a decade ago. And air freight ton miles increased during this decade by about 80 per cent.

The 1980 traffic picture changed, as recession caused a departure from the virtually uninterrrupted growth of U.S. air transportation. Only twice before in the more than 50 years of U.S. scheduled air service has there been an annual decline in passenger traffic. These declines occurred in 1948 and in 1975, and in each of these years the decline was less than one per cent.

The combined impact of recession and inflation, the latter highlighted by fuel costs, is likely to produce a 1980 decline in U.S. passenger traffic of about 5%. Air freight traffic also declined.

Yet, airlines continued in 1980 to account for about 85% of all intercity public passenger miles in the U.S. and well over 90% of travel between the United States and points overseas was by air. The U.S. airlines continue to carry nine out of every 10 of the country's intercity first class letters and about four million tons of freight annually.

The prospects are for a return to growth in U.S. air transport as soon as the recession



abates and more stability is achieved in fuel prices. The Federal Aviation Administration has forecast 500 million airline passengers in the United States annually by 1990. This is ten times the number of passengers carried in 1958, when the jet age in public transportation began.

The earnings picture for the U.S. airlines—and the same can be said for the airlines of many other countries—is one of results not living up to requirements. But the potential for better earnings performance is there, as was illustrated in 1978.

"The U.S. airlines completed the last decade by carrying a record 317 million passengers in 1979 and accounting for 262 billion revenue passenger miles."

In 1978, the U.S. airlines achieved record operating profits of $1.4 billion on revenues of $22.8 billion. The profit margin—the return on each dollar of sales—was about six cents, about average for U.S. manufacturing industries that year.

In 1979, while revenues were rising to $27 billion, operating profits fell to $215 million. The profit margin fell to 0.8, or less than one cent on each dollar of sales. During the first half of 1980, the airlines recorded operating losses of about $490 million. Financially, 1980 will be the worst year in U.S. aviation history.

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Since the higher costs of fuel are the major cause of the inadequate earnings performance, getting more out of each gallon of fuel has become more important than ever before for the industry. New aircraft are available that are substantially more fuel efficient than the older jets to be replaced. The new aircraft are needed as well for fleet modernization, for meaningful noise reduction and to accommodate projected growth in demand for air transportation.

Accomplishing these fleet objectives will require massive amounts of capital. And the capital formation will have to be supportive in the main by earnings at the 1978 level or above, consistently for years to come.

Despite forecasts of continued growth in demand for air transportation, U.S. airline industry fleet modernization plans do not envision any substantial increase in the number of planes in our airline fleets,now at a total of about 2,500 aircraft. The new aircraft will be larger, carrying more passengers and cargo per plane.

But the cost of fleet modernization has increased dramatically. A recent study by the Air Transport Association, for example, foresees a capital formation need of $87 billion to finance the new aircraft that will be needed in the 1980's

Meeting this capital requirement will be one of the most formidable challenges in the history of the U.S. airline industry. Given new management flexibility, more innovation and improved investment tax incentives, there is reason for confidence that the challenge will be met. ■

DEUTSCHE ZUSAMMENFASSUNG

Der Aufsatz befasst sich mit der Entwicklung der amerikanischen Luftfahrt in den siebziger Jahren und versucht eine Prognose fuer das naechste Jahrzehnt. Der Luftverkehr hat eine Zeit starken Wachstums hinter sich. Der Transatlantikflug hat noch immer Aufwind. 1980 waren erstmals mehr Fluege von Auslaendern in den USA zu verzeichnen als umgekehrt.

Der Aufschwung im Transatlantikverkehr (sowohl beim Personen als auch beim Frachtverkehr) ist auf den Wegfall der Preisbindungen und den damit verstaerkten Wettbewerb zurueckzufuehren. Es ist allerdings schwierig, die weiteren wirtschaftlichen Folgen dieser Entwicklung vorherzusagen. Der Markt wird durch stark steigende Treibstoffkosten und die anhaltende Wirschaftsrezession beeintraechtigt.

Auch wenn die US—Luftverkehrsgesellschaften 1980 weniger Treibstoff kauften als 1979, so werden ihre Ausgaben zum Jahresende doch um $4 Milliarden hoeher sein als im Vorjahr. Gleichzeitig faellt im Jahre 1980 das Passagieraufkommen, bedingt durch Inflation und Rezession. Der Rueckgang wird wahrscheinlich 5% ausmachen. Schon 1948 und 1975 gab es ruecklaeufige Passagierzahlen, damals aber in schwaecherem Masse (-1%). So ist es nicht verwunderlich, dass die Gewinne der Fluggesellschaften nicht nur sinken, sondern ganz ausbleiben und viele Firmen tief in die roten Zahlen geraten werden. 1980 wird der US-Luftfahrt den schlechtesten bisher errechneten Jahresabschluss ueberhaupt bringen.

Die Zukunftsaussichten sind jedoch besser. Der herrschende Trend wird wieder in Wachstum umschlagen, wenn die Rezession ueberwunden ist. Die steigenden Rohoelkosten foerdern zudem in starkem Masse die Entwicklung und den Bau neuer, treibstoffsparender Flugzeuge. Dies bringt zwar wiederum Finanzierungsprobleme mit sich. So werden in den 1980er Jahren z.B. $87 Milliarden allein zur Anschaffung neuer Flugzeuge benoetigt. Dennoch rechnet der Autor auf laengere Sicht wieder mit einer positiven Entwicklung der US-Luftfahrt.

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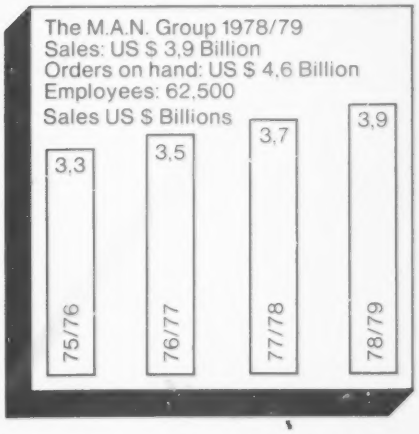

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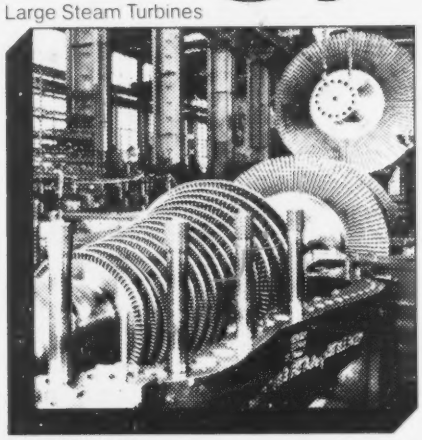

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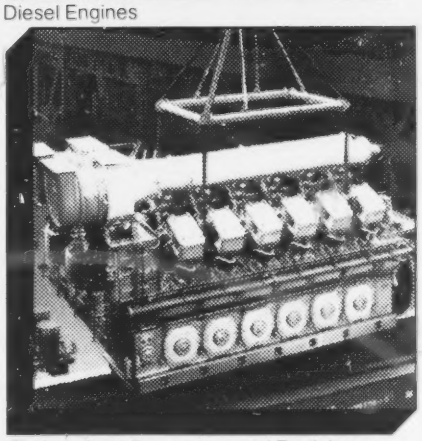

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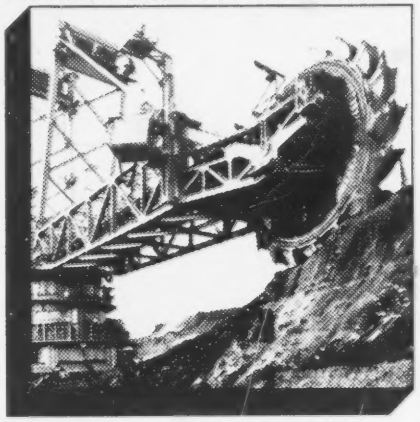

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The European Aerospace Industry: Power in Partnership

by Bernard Lathiere
President,
Airbus Industrie

The European aerospace industry is coming up strong on the 21st century. Once steadfast barriers to trade, commerce, and technology are being melted away by the strength of an industrialized, united Europe. The national aircraft industries of Europe have risen to commercial prominence in the short span of one decade. For the first time in the history of the jet age, we in Europe have a fair chance to build and sell over one thousand aircraft. Airbus Industrie has taken on the challenge and responsibility of bringing this new era in European industrial strength into the next century.

Ten years ago we did not exist. Airbus Industrie was founded in December 1970. When I took over in 1974, we had sold 40 aircraft; in 1976, we sold one. Last year we sold more than 200 aircraft; which represented 30 percent of the total world market. Airbus now has over ten billion dollars in contracts. In four short years, we became the world's second largest builders of civil aircraft, second only to Boeing. The total order book has now exceeded 400 aircraft, a benchmark which could only have been reached through the powerful backing and cooperative spirit of the primary national aviation industries in Europe. The partners in the United Kingdom, France, Germany, and Spain have developed an effective formula for success: cooperation, not confrontation.

The present commercial success of Airbus Industrie has helped overcome the world prejudice against European-built aircraft. In the late 1950's the European aerospace industry was comprised of many relatively small national industries competing against each other. In fact, it was an incredible circumstance which permittd the simultaneous launching of the Caravelle, BAC One-Eleven, and the Trident with little realistic appraisal of market demand. In the case of the Concorde, which symbolized the latest state of the art in European technology, commercial success again eluded us. However, it is important to point out that most of the major technological advances in aviation have been European innovations: turbo-jet engines; swept wing aerodynamics; commercial jet transports; and all-weather landing systems. Europe's commitment to preserve this technical history renewed its determination to succeed in the world arena.

Airbus structure

The Airbus program was officially launched May 29, 1969 when the French and German governments signed the Airbus Intergovernmental Agreement. As planned in this document, a central organization, Airbus Industrie, was created to coordinate the activities associated with the design,

development, testing, certification, manufacture, sale and support of what we believed would become the world's next generation of commercial transports— the A300 and its derivatives. This action brought together the resources of Europe's strongest aerospace companies, each bearing a risk-sharing stake in the future of the program. Aerospatiale 37.9%; Deutsche Airbus (Messerschmitt-Bolkow-Blohm-VFW) 37.9%; British Aerospace 20%; and CASA of Spain 4.2% The consortium is indeed a unique one, at both an industry and governmental level. On the industrial site, Airbus Industrie is in charge of defining, marketing, and supporting its products and organizing and coordinating all activities of the partners and subcontractors. On the government side, the Intergovernmental Committee is comprised of top civil servants of the associated governments which are kept well informed of program status. In this way, the committee is ready to make their industrial obligations. The Airbus structure works precisely because it is a separate entity. Unlike the days of the Concorde when little could be done without unanimous agreement of all partners, they now must be unanimous to stop us.

"The total Airbus employment will reach 45,000 workers by 1985 as we gear up to meet the production goal of ten aircraft per month."

Partner assets total more than seven billion dollars, more than any other aerospace company in the world. The combined labor forces total more than 160,000 workers, with 17,000 assigned to the Airbus project. The total Airbus employment will reach 45,000 workers by 1985 as we gear up to meet the production goal of ten aircraft per month.

World aircraft market requirements

The challenge confronting the world's aircraft manufacturers to the year 2000 will be monumental. In 1978, world airline travel reached approximately 700 billion revenue passenger miles, double the volume in 1970, and fifteen times that recorded before the

birth of the jet age. By 1990, traffic will be burdened by the requirement to purchase huge amounts of new equipment, in excess of 6,000 units. At the same time, older fuel-thirsty aircraft will have to be replaced. If virtually no global activity has escaped the strangle-hold of OPEC, surely the airline industry has been one of those hardest hit. A startling 30 to 40 percent of their operating budgets must now go for fuel. Even a one cent increase will mean tens of millions of dollars in additional operating cost annually. Furthermore, older generation aircraft cannot meet the new noise and pollution standards, a condition which will escalate replacement rates. The industry watchword for the next twenty years will be fuel. Fuel, its rising costs and availability, will be the greatest factor in shaping aircraft technology to the next century.

As a result of these conditions, we estimate the airlines will require 2,500 to 3,000 aircraft by 1993 of the short to medium range size twin-engine widebodies. Based on existing customers needs, Airbus Industrie will sell more than 900 aircraft in this market slot, and we fully expect to garner thirty percent of the "open" market.

Future aircraft technology

As we look toward the turn of the century, Airbus Industrie is already preparing to meet the needs of the airlines with design plans for several derivatives on our family concept of aircraft. This now includes the 250-seat A300; the 200-seat A310; and the convertible-freighter. This family concept will offer the airlines the greatest commonality and flexibility in their fleets. Which one of these designs will be built and when can only be dictated by the market; therefore, the order in which they are discussed may not necessarily be the order in which they are built.

First, the TA9 (meaning twin-aisle) version will be a stretched A300 offering 25 percent more passenger capacity with its 300 seats and 50 percent more cargo capacity than the A300. The result is exceptional earning power for operators.

Second, we are studying the requirements for a 200-seat non-stop transoceanic express under the project designation of TA11. This four-engine version is the answer to airline needs for new generation aircraft on long range, lower capacity routes, an ideal replacement for DC8's and B707's.

Finally, a 120 to 170-seat advance single aisle project, the SA1 and the SA2, is under consideration to satisfy demand in markets needing less capacity than the A310. As development costs are substantial, we will launch such a program only when we are certain to have a significant technical jump over the 727's and DC9's. A manufacturer must offer its customers a sizable advantage in operating costs. A five percent reduction will not do—it must be so attractive as to warrant the costs of airlines diversifying their fleets.

"Fuel, its rising costs and availability, will be the greatest factor in shaping aircraft technology to the next century."

Aircraft designed for the new decade will undergo a continuous and intensive product improvement program. Manufacturers will be striving to achieve advances in aerodynamics, construction techniques, and engine performance enabling airlines to lower operating costs and increase revenue potential. For example, Airbus Industrie will feature advance engineering systems on the A310 which will have matured in service on the A300. A full range of digital avionics will increase cockpit reliability, crew efficiency, and passenger safety; advanced composite materials in secondary structure will reduce airframe weight; improved versions of proven engines will increase fuel economy. Unless alternative fuels become available near term, airline financial survival may grow more dependent on the ability of manufacturers to develop highly fuel-efficient airplanes.

Financing new aircraft

Financing the development of high technology aircraft, produced in the numbers required by market demand, will involve a major commitment on the part of the world banking community. As much as 300 billion dollars will be needed by the year 2000 to finance aircraft sales to airline customers. The manufacturers, banks, and governments must now work closely together to insure a healthy future for air transportation. A brief look at the

"As much as 300 billion dollars will be needed by the year 2000 to finance aircraft sales to airline customers."

methodology of Airbus sales financing is a point of interest.

As of today, out of the 421 orders on the books, we have delivered 107 airplanes outside France, Germany, Spain, and the United Kingdom. We are "at home" in these countries and, consequently, these airlines are not financed with export credit.

These sales to, let us say, third world countries have been financed as follows: 1)Should the airlines make use of all the export credits that have been committed to them with the support of Coface, Hermes, ECGD (and it is unlikely this will happen), such export credit would represent about 60 percent of our firm sales to these aircraft to date; 2) About 20 percent of the dollar value of the airplanes that have been delivered to these airlines have been financed by non-European banks. Selling an airplane not only means it must be the best equipment on the market for the job intended, but also that it be placed into service expeditiously. This means structuring an overall financing package which makes sense and satisfies all parties involved: the manufacturer, the airline, and its existing and potential lenders. Several of the major American financial institutions have already been engaged in the financing of Airbus products. And we are grateful for the solidarity and support they have extended us. We look forward to a continued strengthening of the relationship between Airbus and the U.S. banking community. The potential needs are extremely large. It is an area where a closer relationship over the ocean will prove mutually beneficial.

The competitive evolution

It is precisely because the challenges, opportunities,and demand for air transportation are so great that we are confronted with even tougher competition between manufacturers – some fighting for their very survival. Cooperation, not confrontation must now replace the struggle of competition. We must now assume roles of manufacturing statesman and work to preserve the technical advances thus far realized. The time has passed when one country or company, not even the most powerful, can afford to bear the multi-billion dollar burden for new aircraft design and development.

As a responsible and united European aircraft industry, we have the will and ability to increase the range of products offered by Airbus Industrie so that for the rest of the century airline equipment needs will be met. We hope to make a contribution to the successful future of air transportation by providing a choice. No longer will any one manufacturer dominate the world civil aircraft market. Eurone buys 25 percent of the world's planes but, until recently, as manufacturers we had only two percent of the business. We have a responsibility to redress the imbalance which has left Europe industrially hungry for so long.

With a strong, alive, and free European aircraft industry, we can begin to develop cooperation with our American counterparts. There is power in partnership. It is not, as is sometimes described, Europe against the United States. The A300 has a very large percentage of American content—about 30 percent including the engines made in the U.S. by General Electric and Pratt and Whitney. The U.S. content represents close to ten million dollars per aircraft. It you take the more than 400 Airbus aircraft sold to date, our sales activity has had a positive affect on the U.S. balance of payments of several billion dollars. Every time an Airbus is sold, we help sell American labor, in equivalent to the man-hours in a DC9 or B737. The A300 is not a European venture, but a transatlantic one, built as surely in Cincinnati and East Hartford, as it is in Hamburg, Chester or Toulouse.

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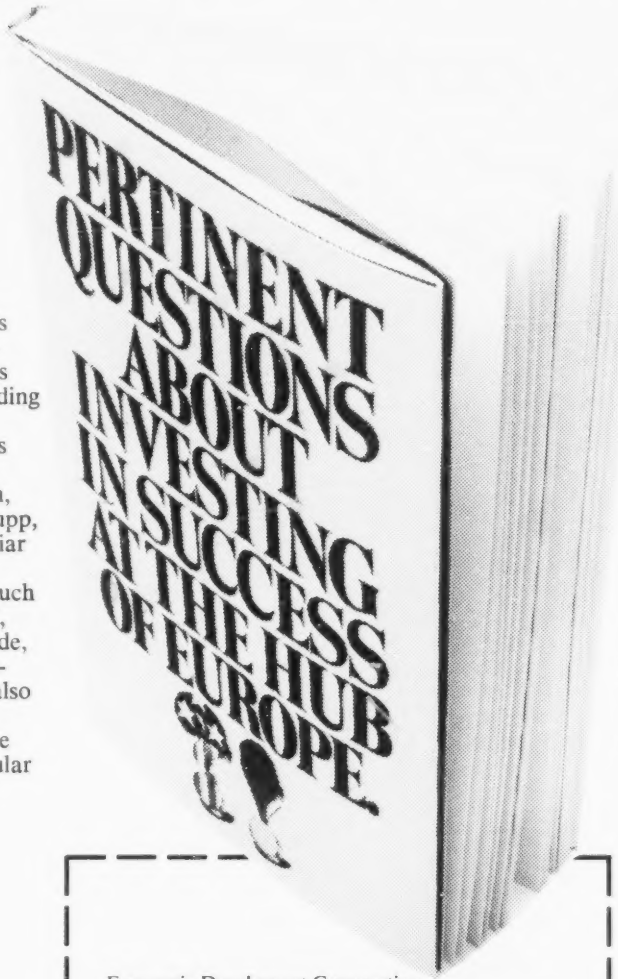

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Airbus Industrie is an incredible mixture of cultures, educations, working habits, and creativity. The very spirit that binds us has enabled us to originate the renaissance of an entire industry. But the work is not complete. We must firmly establish an industrial stance comparable to one that we play commercially. Only by working together as builders, operators, governments, banks, and corporations can we insure that the air transportation industry meets the 21st century head on. It is a time to adjust and tighten the links that unite us as industrial countries. It will help to keep the doors of world trade open. It will help to stabilize our economies. It will help to guarantee a healthy future for our children — and for that — we will never give up. ■

DEUTSCHE ZUSAMMENFASSUNG

Bernard Lathiere schildert die Entwicklung des Airbus und seine Marktchancen fuer die Zukunft. Er stellt das Projekt als hoffnungsvolles Beispiel fuer ein Miteinander statt des bisherigen Gegeneinander auch ueber den Atlantik hinweg nach USA dar. Im Laufe von nur vier Jahren avancierte Airbus Industrie zum zweitgroessten Flugzeughersteller der Welt. 107 Maschinen sind an die Kaeufer auslieferbar. Das Auftragsbuch ist mit 400 Maschinen fuer die Zukunft gut gefuellt. Bis 1993 koennten 900 Flugzeuge verkauft werden. Dieser Erfolg wird gerade durch die Zusammenarbeit mehrerer Nationen (Deutschland, Frankreich, Grossbritannien und Spanien) moeglich.

Die Verwirklichung des Projektes Airbus begann 1969, als Deutschland und Frankreich sich vertraglich auf die Entwicklung und Herstellung eines Kurzstrecken-Grossraumpassagierflugzeuges einigten. Dabei sollte eine zentrale Organisation, die "Airbus Industrie", Entwicklung, Erprobung, Herstellung etc. uebernehmen. Mit der Verwirklichung des Projektes konnten Tausende von neuen Arbeitsplaetzen geschaffen werden.

Der Airbus wurde gerade in ein Zeitalter hineingeboren, in dem der Flugverkehr durch stark steigenden Bedarf und auch durch steigende Oelpreise nach neuen, vor allen Dingen grossen und kostensparenden Flugzeugen suchte. Dies gab der Airbus Industrie eine ausgezeichnete Ausgangsbasis und liess sie bis heute einen Marktanteil von bereits 30% aller Neuanschaffungen erreichen. Fuer die Zukunft ist geplant, die Modellreihe zu erweitern, um ein modifiziertes Platzangebot bieten zu koennen und auch fuer den Transatlantikflug geruestet zu sein. Die neuen Modelle sollen jedoch nur dann in Produktion gehen, wenn von vornherein eine ausreichende Abnahme sichergestellt ist.

Die Finanzierung stellt einen ganz entscheidenden Faktor fuer Entwicklung, Bau und Verkauf der neuen Airbus-Modelle dar. Dabei handelt es sich bis zum Jahre 2000 um Betraege von mehreren Hundert Milliarden Dollar. Zur Loesung der damit verbundenen Probleme ist eine enge Zusammenarbeit zwischen Hersteller, Banken und Regierungen unerlaesslich.

Durch die steigende Konkurrenzfaehigkeit Europas auf dem Gebiet des Flugzeugbaus wird es in Zukunft leichter sein, zu der notwendigen Zusammenarbeit mit der amerikanischen Zivilluftfahrtindustrie zu kommen. Gerade das Airbus-Programm bietet hier einen Ansatzpunkt. 30% der Einzelteile des Flugzeuges werden in den USA hergestellt.

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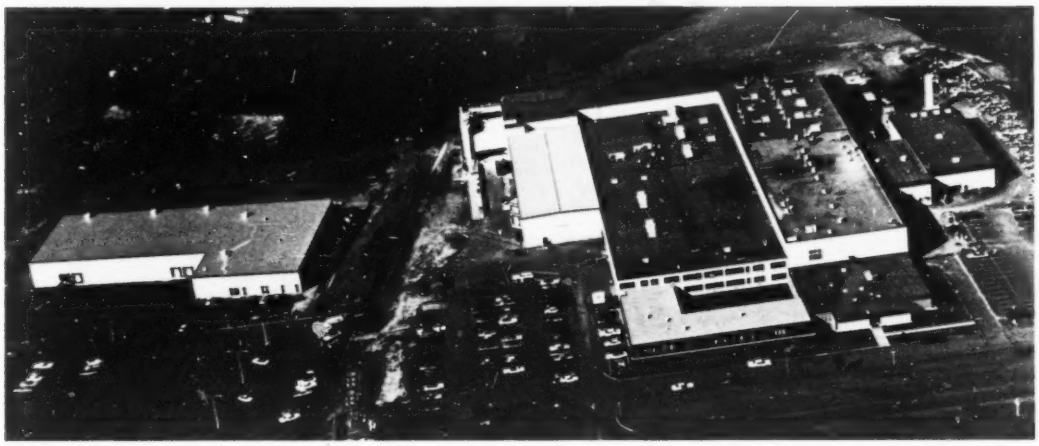

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Hydrogen-Fueled Aircraft

by G. Daniel Brewer
Manager, Hydrogen Programs, Lockheed-California Company

The consensus of responsible scientific opinion is that the peak of production of the world's supply of economically recoverable petroleum will be reached in about 20 years. This estimate includes allowances for vast fields of crude oil not yet discovered, and consideration of significant improvement over the rather dismal 31.6 percent recovery factor of oil from existing fields which is characteristic of today's practice.

Once the "easy" oil has been recovered, both the price and availability of petroleum-based products can be expected to become less and less attractive.

Those goods and services which are especially sensitive to the cost and availability of such products will require that serious attention be given to consideration of alternatives. Commercial aviation is a case in point. Aircraft are completely dependent upon ample quantities of fuel being available at an acceptable price wherever they fly. International operations demand worldwide availability of the fuel. At current prices, fuel for U.S. domestic air carriers accounts for approximately 40 percent of direct operating cost. As petroleum prices escalate in the future due to the inevitable worsening of the supply situation, this percentage will drastically increase and direct operating costs will soar.

The path of least resistance is to continue using the current fuel as long as it is available, broaden the specification to achieve a greater yield of usable product per barrel of crude oil, and start manufacturing synthetic Jet A from coal, shale, and/or tar sands. This minimizes the problem of changeover of equipment and facilities at airports, fuel storage areas, as well as the aircraft themselves.

With its tremendous fossil resources, this course is especially attractive to many in the United States. Unfortunately, the result would be to trade short term and local advantages for long term worldwide problems.

There are many areas of the world which have little or no fossil resources so that ultimately the switch to a non-fossil fuel will have to be made. The sooner this switch is made the easier it will be because of the rapid growth anticipated for the air transport industry. A recent forecast is that the number of revenue passenger miles flown per

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This article is excerpted from a presentation, "A Proposed Liquid Hydrogen Program for Aircraft", which was presented last year at the symposium "Hydrogen in Air Transportation", in Stuttgart, Germany by G.D. Brewer, Manager, Hydrogen Programs, Lockheed—California Company.

year will double by 1991, an annual growth rate of nearly 6 percent. Cargo traffic is expected to increase even faster, at an 11 percent annual rate, so that doubling of present (1978) revenue ton miles will occur by 1985.

A bold approach is needed now to initiate a program which will provide information so that a preferred alternate fuel, i.e., one which will be the best choice far into the future, can be selected on a rational basis in the next four or five years.

"... emphasis should be placed on consideration of global availability, safety, pollution and noise."

A leading candidate

A previous paper in this symposium outlined some specific advantages to be gained if liquid hydrogen is adopted as the fuel for future transport aircraft. The most important of these advantages is that the fuel can be made available on a global basis, although not necessarily at the same price in all areas; it offers the possibility of added safety, although it is a very high energy fuel and must be handled with due respect; it provides a uniquely clean exhaust, although when made from coal there will be typical noxious emissions at the manufacturing plant; and LH_2-fueled aircraft are noticeably quieter than equivalent designs based on other fuels.

Evaluation of the candidate fuels in terms of total process energy (the amount of basic resource needed to manufacture the aircraft fuel required for a specified mission) and direct operating cost, depends on the fuel manufacturing process and the accounting principles employed, and the aircraft mission. For a typical long range subsonic aircraft, and where coal is the basic resource used to manufacture each of the alternate fuels, LH_2 has been shown to offer attractive advantages over synthetic jet fuel (synjet). It is a virtual standoff with liquid methane (LCH_3) in terms of total process energy but is at a slight disadvantage in direct operating cost.

As mentioned above, emphasis should be placed on consideration of global availability, safety, pollution and noise. Cost and process energy comparisons are important only if a country has multiple resources and processes from which candidate fuels can be derived. For those areas of the world with little or no fossil materials the question is academic.

In physical parameters LH_2-fueled aircraft also offer advantages. Characteristically, they are significantly lighter in gross weight and they have smaller wings; however, because of the low density of the fuel, they have larger fuselages. Engines on LH_2-fueled aircraft will require less maintenance and provide longer life. As an item of increasing significance at today's crowded airports, LH_2-fueled designs are able to operate from shorter runways with less performance penalty.

In view of these advantages, LH_2 must be regarded as a very promising candidate to replace petroleum-derived Jet A fuel for use in transport aircraft. However, there is much to be learned about liquid hydrogen before it can be fairly evaluated and compared with the other candidate fuels.

The work to date has consisted primarily of theoretical analyses and conceptual design studies. A comprehensive experimental program is needed to demonstrate advanced technology in each of several areas. These areas include manufacture of the fuel, use of the fuel in aircraft, and handling of the fuel and the aircraft at the airport.

A proposed development program

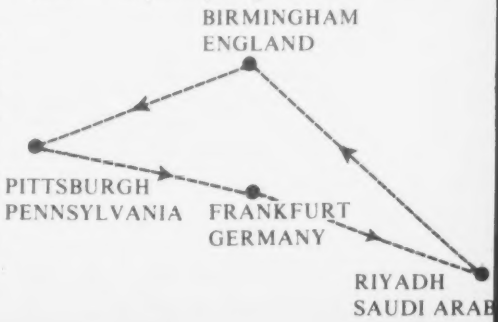
To provide incentive and a meaningful basis for development in each of the specified areas, the following program is proposed.

Create an experimental airline to be organized and operated under government sponsorship for at least two years. The airline would use four LH_2-fueled, wide-body aircraft to carry commercial cargo on a regularly scheduled basis between the United States, Western Europe and the Middle East.

The aircraft would have the capability of carrying at least 45,360 kg (100,000 lb) of payload a minimum distance of 6,600 km (3560 n.mi.).

Four major cities would be selected as principal operating terminals. Airports of these cities would be provided with facilities to service the aircraft with 18.14 tonnes (20 tons) of LH_2 per day. Advanced technology hydrogen manufacturing and liquefaction methods would be used, with each country free to choose its own processes for development.

The following sketch illustrates an example of a route involving four cities which have been suggested to typify the operating terminals of the proposed LH_2 airline. It is emphasized that these cities are designated merely to serve as examples. The selection of the actual terminals for the proposed operation will be a matter for decision by each of the participating countries.



The cities designated in the figure were suggested because a significant quantity of air cargo is currently dispatched from each, and because they are located in areas with access to resources which can be used to manufacture hydrogen economically. Pittsburgh, Frankfurt, and Birmingham are located near coal fields. Riyadh has access to large quantities of natural gas which is currently being flared. Since processes using natural gas, oil, and coal are, respectively, the lowest cost methods devised to date for producing hydrogen, it might be expected these resources would be given consideration in locating the terminal cities.

It is important to emphasize, however, that one of the major objectives of the proposed plan is to further the development of advanced processes for manufacturing and liquefying hydrogen. The choice of manufacturing process and the natural resource to be used will be the decision of the country involved. For example, Saudi Arabia might decide that development of solar technology to generate electricity, combined with use of an advanced electroiysis process to manufacture hydrogen directly from water is more compatible with their long-range plans. Such considerations may influence the choice of cities which are finally designated as operating terminals.

It could happen that each of the four cities selected for the initial route structure uses a different process for manufacturing liquid hydrogen. This could be very desirable because it would provide information about the efficiency and cost of more processes for producing the fuel.

One of the objectives of the program is to establish procedures which lead to safe and economically effective operational procedures with the new fuel. To minimize non-hydrogen related problems an airline experienced in international operations, and preferably, in operating the type of aircraft modified for the LH_2 experiment, would be selected for the program. The airline would establish a set of operational procedures which would serve as a basis for initiating service, and for judging the relative merits of alternate procedures subsequently tried during the course of the experiment.

Another of the objectives of the program is to provide experience which will expedite the use of LH_2 throughout the world. Accordingly, operation of the experimental airline should provide for as wide representation as possible from the interested aviation community. To do this, after initial operational experience has established viable routines, crew members from other airlines would be assimilated into all phases of the operation so first hand knowledge is made available to as many as possible.

Implementation of this program is predicated on the assumption of government funding. The fundamental rationale used in the United States to determine whether or not a given case warrants such support is as follows: "-----government intervention is justified if the private sector operating by itself will not produce goods and services in a combination or at an overall level that is most beneficial to society." The development of a new fuel for the worldwide air transport industry is an undertaking which meets this rationale as well as the three specific criteria usually used in assessing the validity of a request for government support:

- The benefits to society exceed the costs.
- The net benefit far exceeds that from alternatives.
- There is inadequate incentive for industry, per se, to undertake the development.

Without government support the industry would probably follow the line of least resistance and simply continue using conventional Jet A fuel, or a derivative thereof, until the supply problem becomes untenable. By that time it would be too late to begin orderly development of an alternate fuel and government intervention would become mandatory.

A unique feature of the proposed program is that it is international in scope and involves cooperative effort on the part of four governments. The problems associated with undertaking a technology development program involving four different countries are recognized. It would be far simpler to deal with only one government. However, in this case where the product will have worldwide application, it is thought that the involvement of multiple governments will have beneficial effects. One, there should be a mutual reinforcement of interest and resolve during the program; two, the results of the development will be more widely dispersed with a higher level of understanding; three, with hydrogen manufacture and liquefaction plants, plus airport facilities, already in place in four strategic cities the expanded use of LH_2 fuel in aircraft following this development phase will be greatly expedited.

"A unique feature of the proposed program is that it is international in scope and involves cooperative effort on the part of four governments."

Schedule

Based on a program go-ahead in mid-1980, commercial operations could begin in 1987. This schedule is predicated on development of advanced hydrogen manufacturing processes as the pacing activity. The continuous steam-iron process, under development by the Institute of Gas Technology, was chosen to represent the United States capability for manufacturing hydrogen from coal because it has been

shown to have considerable promise. In any event, it was felt that its development requirements would represent the time scale needed for any of the other competitive advanced coal gasification processes currently being considered. A further assumption was that other processes for manufacturing hydrogen which might be selected by each of the countries involved in the proposed program could be developed in accordance with a similar schedule.

Under sponsorship of the U.S. Department of Energy and the American Gas Association, the Institute of Gas Technology has constructed a pilot plant of the continuous steam–iron process in Chicago which is one-seventh the size required at Pittsburgh to service the subject LH_2-fueled freighter aircraft. According to the schedule, the 18.14 tonne (20 ton) per day plant can be designed with the benefit of 2½ years of operation of the experimental pilot facility.

The schedule also assumes an early start on development of critical technologies for the aircraft: hydrogen pumps, fuel containment system, and engine modifications required to take advantage effectively of the unique properties of hydrogen. However, these items are not considered as critical to the development schedule as is hydrogen manufacture. The requirements of technology development for aircraft and engine components are discussed subsequently.

Nearly two and one-half years after initiation of the technology development program a decision is called for concerning start-up of the airline demonstration program. This decision would commit the participating governments to building aircraft, hydrogen production facilities, and airport facilities at the selected cities, and to operating the proposed airline for at least two years.

Operation of the aircraft for a minimum of two years in the environment of a commercially competitive enterprise is felt to be necessary to achieve the goals of learning how to operate and maintain the hydrogen-peculiar equipment that will be involved, and to establish a firm basis for future design requirements. At the end of two years, or a longer period if experience dictates, the cargo-carrying operation will be terminated and the results assessed. At this point the development program can be considered to be completed. ■

DEUTSCHE ZUSAMMENFASSUNG

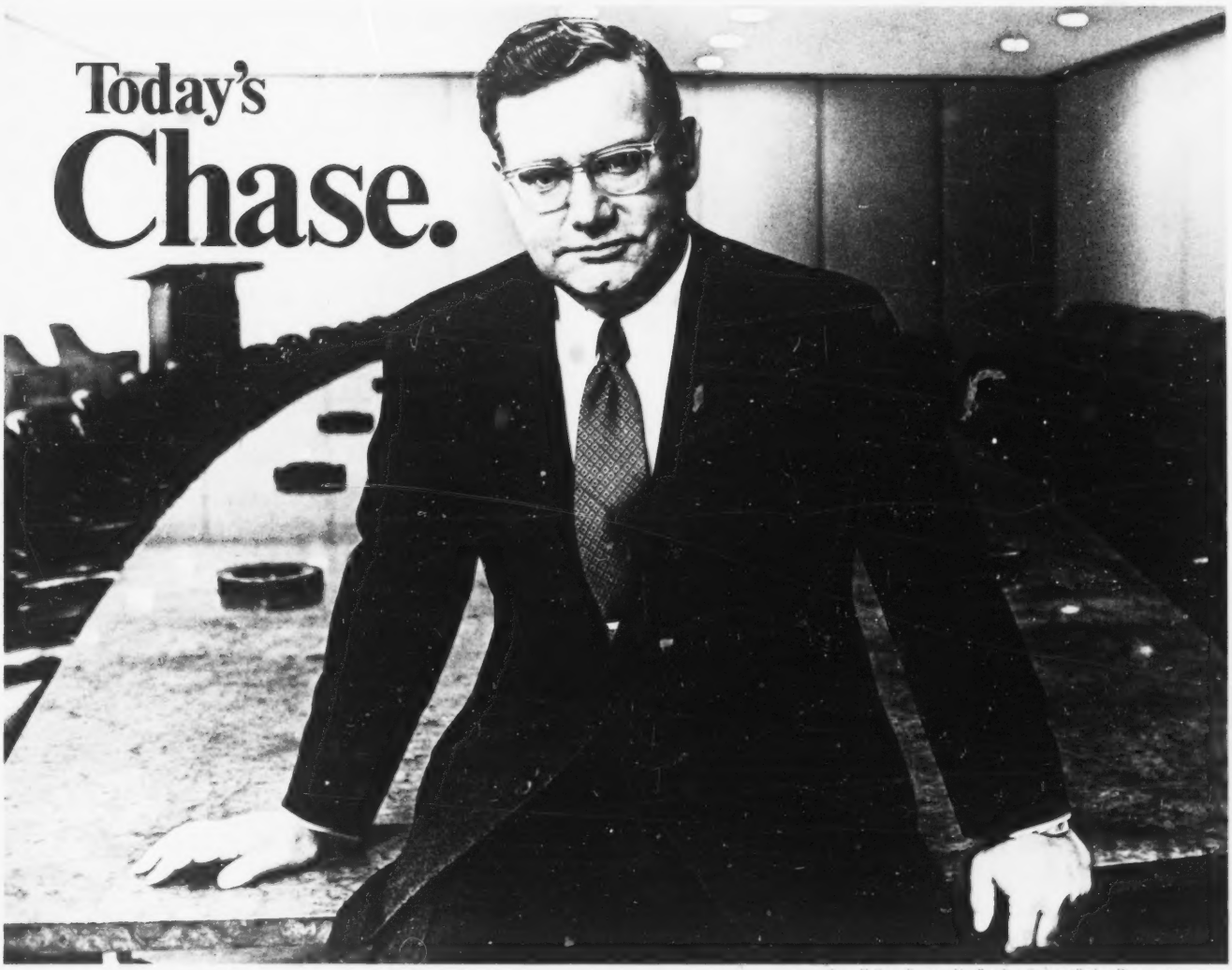
Irgendwann gehen die Weltoelvorraete einmal zu Ende. Nach juengsten Schaetzungen wird die Rohoelproduktion im Jahrzehnt 1990-2000 ihren Hoehepunkt erreichen.

Es ist daher jetzt an der Zeit, positive und wirkungsvolle Massnahmen zu ergreifen, um einen geeigneten Treibstoff fuer den Lufttransport der Zukunft zu finden. Die Wahl sollte allerdings in voller Kenntnis aller wirtschaftlicher, soziologischer und technologischer Auswirkungen getroffen werden. Dabei sind insbesondere die weltweiten Aspekte von Bedeutung. Oertliche Vorteile oder Nutzen von nur kurzfristiger Dauer, die sich schon innerhalb weniger Jahrzehnte als hinfaellig erweisen, sollten bei den Ueberlegungen nicht den Ausschlag geben.

Aufgrund konzeptioneller Planstudien und theoretischer Analysen hat sich der fluessige Wasserstoff als sehr vielversprechender Kandidat erwiesen. Versuchsdaten und praktische Erfahrung muessen nun aufzeigen, ob er als Treibstoff fuer den Lufttransport praktisch und erstrebenswert ist.

Ein umfangreiches Programm ist vorgeschlagen, welches die zur effizienten Herstellung und Verfluessigung von Wasserstoff noetige Technologie entwickelt. Ausserdem wird ein Demonstrationsprogramm angeregt, das mit Hilfe von vier LH_2—betriebenen-Jumbo-Transportflugzeugen Luftfracht im Linienverkehr zwischen den Vereinigten Staaten, Westeuropa und dem Nahen Osten befoerdern soll und so auf internationaler Ebene praktische Erfahrung sammelt.

Das vorgeschlagene Programm wird die technischen Daten liefern, die zu einer gruendlichen Bewertung des fluessigen Wasserstoffs im Vergleich mit anderen, zur Wahl stehenden Treibstoffen noetig sind. Ebenfalls wichtig ist dabei, dass das Programm die Oeffentlichkeit von seinen vielen aussergewoehnlichen Vorteilen ueberzeugen kann und eine Grundlage schafft, das Vertrauen der Allgemeinheit in seine Sicherheit zu gewinnen.



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Stephan: View of Marienplatz in Munich (original at City-Museum)

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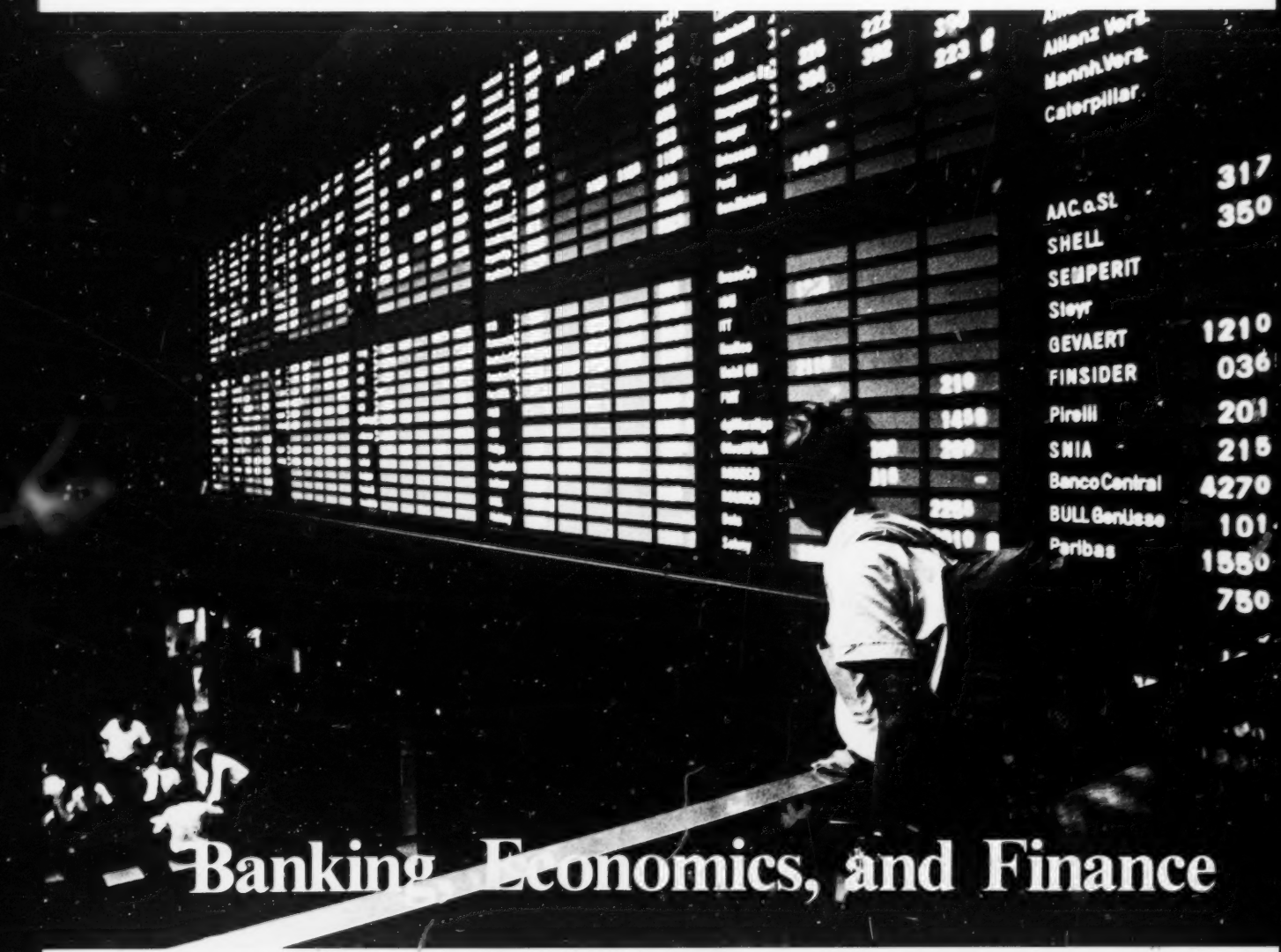
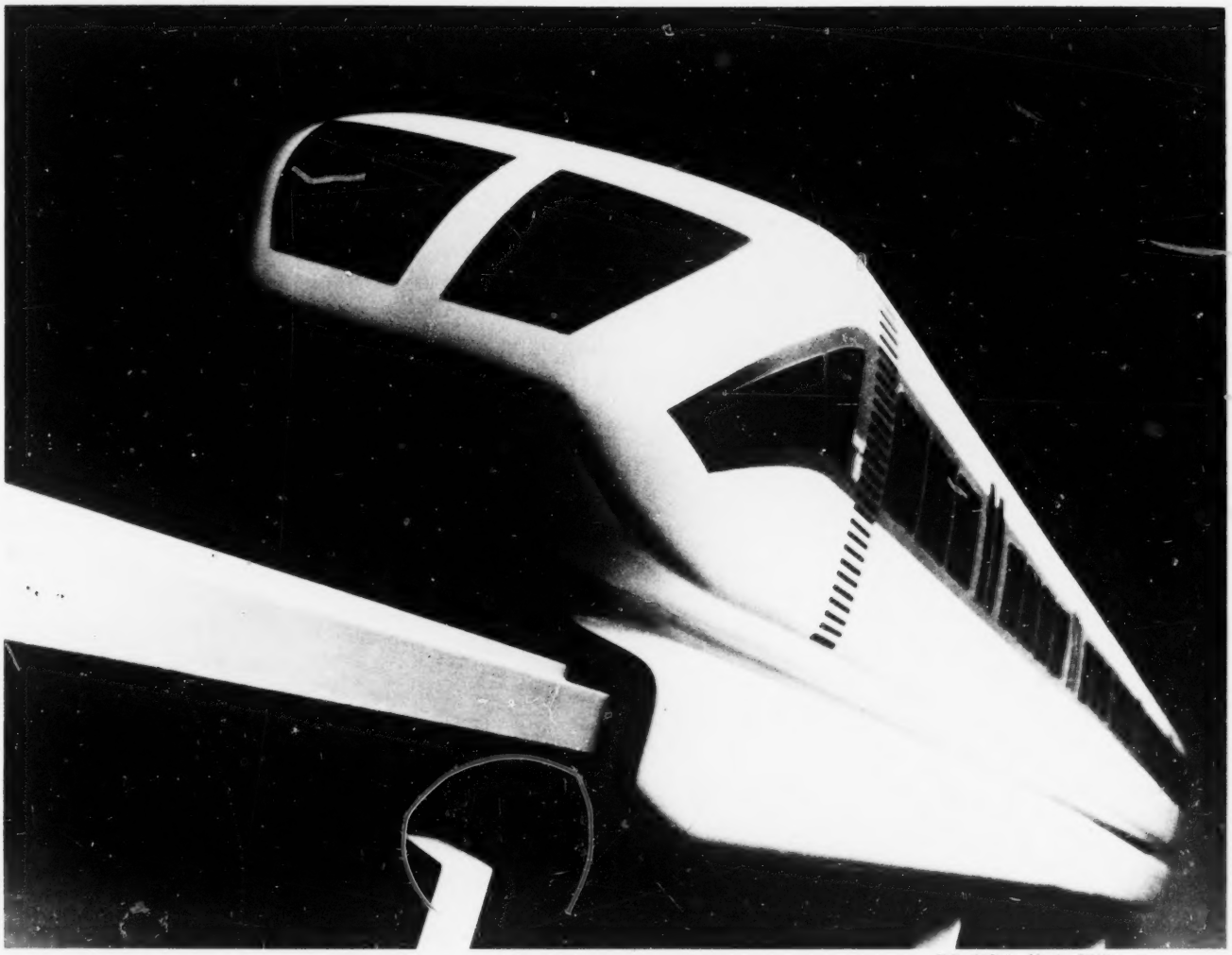


Banking, Economics, and Finance



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A Case for Supply Policy

by Prof. Dr. Olaf Sievert
Council of Economic Experts, Wiesbaden

The start into the Eighties has not been an easy one for the world: rising inflation, increased unemployment, small increases in production, escalating problems in the developing countries. The price of oil was at the bottom of the difficulties: a decrease in income and buying power, massive losses suffered by the balance of payments, and the sudden upward movements of the price level. However, the shock of the oil prices was not the only culprit. In almost all countries, home-made inflation had also accelerated.

Can the market economies of the western world be expected to be able to cope with their problems? Under the pressure of painful experiences, the economic policies of major countries and the economic policy concepts of all important international organizations have undergone a change deserving favorable judgment. The world is more than ever prepared to fight inflation energetically. The illusion that more permanent employment could be accomplished by allowing more inflation has dwindled (even if it has not vanished altogether). The understanding of the adjustments necessitated by higher oil prices has grown. During the first oil crisis in 1973-74, even well-known economists all over the world would focus their attention primarily on the gap in demand created by the sudden revenue surplus in the hands of the OPEC countries.

Today, it is common knowledge that the necessary adjustments are: reduced consumption and stepped up investment—stepped up investment in order to be able to substitute for oil, or to save energy as such, and stepped up investment also in order to be able to continue to pay the permanently higher oil bill—rather than to have to ask for a moratorium—by applying an improved industrial capacity in an environment of stronger international competition towards a gradual increase in the export volume. However, the improvement of the investment climate almost everywhere falls far short of the challenge. Economic policy is still preoccupied with the consequences of its own sins in the past, stemming inflation and high government deficits, and is not at liberty to attend to the tasks of the future.

> ***"The illusion that more permanent employment could be accomplished by allowing more inflation has dwindled . . ."***

Recession: an inept cure

There is considerable risk that a new worldwide recession may result from international unison in these stabilizing efforts. For certain countries, the roundabout way via a stabilizing crisis may have become unavoidable—certainly for Great Britain, possibly for the United States. Still, basically this is not a satisfactory solution for the world as a whole. It is as inept an approach as is the saving of energy by means of a worldwide recession; economizing and substituting oil should be accomplished on the initiative of the individual company and private household, encouraged by the appropriate price incentives, not forcibly brought about by a macro-economic reduction in output and income (nor by government regulation).

It is correct that, in view of the enormous investment task facing the industrialized nations, we must consider low interest rates desirable. But it is also correct that we should not wish for low interest rates at the central bank level. Lowering interest rates by providing an ample supply of money is short-sighted policy. The interest rates for long-term loans which have the greatest impact in this could not be lowered permanently, if at all, in this manner. Such policy would be obsolete in no time and new increases in interest rates would be the result of an accelerated inflation—be it real, or merely anticipated.

"Even now, attention tends to focus too much on cyclical economic problems, while the need for structural adjustments and renewal is still widely ignored."

In terms of an improved investment climate, in which they play a vital role, we must wish for a steady lowering of interest rates as a result of capital's improved propensity to invest and of the capital markets' relief from spending on credit, especially on the part of governments. A lastingly improved propensity to invest, making venture capital available on a long-term basis at comparatively low interest rates, can only be expected if confidence in the stability of the currency can be restored and if the general economic environment keeps investment risks at a reasonable level. This implies minimum government intervention in the private sector, continuity and predictability of economic policies as well as flexibility in the negotiations of all parties engaging in collective bargaining.

The monetarists' assurances that it is enough to deny an excessive supply of money to render all further inflation impossible, is certainly correct. But, in order to ensure a satisfactory development in all other respects, especially where employment is concerned, more needs to be done. We should certainly not be afraid of demand becoming scarce, nor of a lack of work waiting to be done in this world. But the feeling of uncertainty about the future appears to have become more intense, as has the challenge to make structural changes. At the same time, whatever our qualifications for coming to grips with the job before us may have been—the readiness and capability to cope with risk, flexibility in every respect as well as a talent for adapting one's income expectations to the economy's performance—they have become fewer. They are the fundamental supply conditions of an economy. Placing the emphasis on their improvement rather than on demand management must be any government's policy, and not just its economic policy either.

Even now, attention tends to focus too much on cyclical economic problems, while the need for structural adjustments and renewal is still widely ignored. The supply conditions of an economy determine the cost of the friction caused by the structural adjustment process—costs in the form of temporary partial unemployment or of inflation. But even supply policy is far from independent in the important issues. Regaining flexibility for the economy and increasing the readiness to take on risks is a tough job. In the short run, governments must concentrate primarily on what they can influence directly to some extent. In view of the important role to be played by private investment gaining momentum in the next few years, even a frugal government will have to provide strong incentives for such investment—which must not, of course, be financed by renewed deficit spending but rather by economizing in other places in the budget. Unless such incentives are provided, transition to a long-term development characterized by the powerful expansion of private investment, and no significant expansion of private and public consumption, could prove difficult.

The increase in investment in new products and technologies as well as in the capital goods industry itself will have to compensate for what lethargy private consumption might produce. All countries with confidence in their capability to solve their inflation problems without a lengthy period of intentional stagnation should

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therefore be ready for comprehensive measures to encourage investment. The desirable encouragement of investment would have to be as global as possible, of course. Too many subsidies are already used for differentiating government intervention purposes.

Due to the widespread inclination to overemphasize their short-term effects on income distribution, incentives for investment all too often are not especially popular, ever more so at a time when private consumption is weak. Still, one should not yield to requests for fiscal support for private consumption. If an economic world summit meeting were scheduled today, one would hope that the government heads would pledge their word to insist at home on a policy of massive promotion of investment without simultaneously blocking a monetary policy oriented towards stability, and to resist all temptation to lower the general tax rates.

An improved investment climate in as many countries as possible is also the essence of the recycling problem posed by the billions of oil money. The solution for this problem, after all, calls for an increase in the number of creditworthy nations worldwide.

German economic horizon

The economic problems facing the Federal Republic of Germany have meanwhile become essentially the same as those confronting other industrial nations. There is one important exception, however. The Federal Republic is ahead of many other countries in the fight against inflation and thus does not have to induce a stabilizing crisis. Traditionally, currency stability has ranked high among the goals of the Federal Republic. This facilitated, even before the inflation rate approached 8 per cent during the first oil crisis, the return to an energetic stability policy which, true enough, had been abandoned in the early Seventies. In the years following 1974, the inflation rate could eventually be held down to almost 2 per cent, and even the inflationary effects of the new

“An improved investment climate in as many countries as possible is also the essence of the recycling problem posed by the billions of oil money.”

oil price shock in 1979-80 were brought under control in comparatively short time. During recent months, consumer prices rose by an annual rate of some 4 per cent, and expectations are that the rate will be further reduced.

The German government and the German Central Bank have in past years accepted for the sake of controlling inflation that the German economy would recover only slowly from the severe blow dealt to employment by the worldwide recession in 1975. The economy was to emerge from this crisis with healthy supply conditions: a modernized industrial structure; an easing of wage pressure; reduced investment risks; and an increased readiness to take risks. The government supported the recovery process by supply policy measures including tax abatements for companies, stronger encouragement for innovations both in products and technology, and promotion of economic dynamics from below stemming from the establishing of new and the development of small business. Only comparatively later, and under international pressure (stronger than it felt was warranted), did the government intervene massively in the demand sector by introducing tax cuts and additional government spending. But even before the final strong push of government induced demand came to take effect, the upswing of the economy had begun, due largely to a rising propensity to invest privately. And it is one of the faith-inspiring moments in an otherwise increasingly clouded macro-economic situation that the companies' propensity to invest, although distinctly weakened, appears to be basically unperturbed.

Lingering headaches

So much for the light colors in the picture of the German economy. And yet three enormous problems cast deep shadows here as everywhere else:

- Steeply increased government expenditures, entailing huge deficits in the public budgets;
- Mounting deficits in the balance of payments on current account, highly unusual for the Federal Republic heretofore—deficits, at that, of quite spectacular dimensions;
- Unending difficulties encountered in the attempt to enforce an energy policy which would reduce dependency on oil supplies from the OPEC countries.

The high deficits in public budgets are in part inherited from an expansionary government spending policy in the early

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Seventies which was never effectively corrected, and in part are also the result of a strongly expansive demand policy in the years from 1978 until now. Impatience with economic policies and pressure from international agreements have caused public deficits to continue to rise (to almost $30 billion, or approximately 3 per cent of the national product), even after the economic upswing was well under way. Government stands firm in its resolve to reduce taxes significantly in 1981. To be able to avoid increased deficits, the growth in public spending next year must be kept to an absolute minimum, below that of the current inflation rate. This is the goal of all budget planning, however unfavorable economic predictions for 1981 may be. The public, after all, has begun to feel worried by the prospect that high public debt could endanger the currency, that the rapid rise of the burden of interest in the public budget might further limit the funds available for government tasks in the future, and that government will have to interfere more and more with the much propagated continued steep rise of private investment if it does not manage to limit its demand for capital. Besides, looking a little further ahead, there can be no doubt that reduction of government spending constitutes a contractive demand policy, but an active supply policy. It lowers the expectations which the government superimposes on the private sector, regardless of whether it finances its demand by tax money or by loans (thereby putting upward pressure on interest rates).

However, it is the balance of payments which should strengthen the government's resolve to stick to the proclaimed basic policy of highly restrictive spending. For the deficit in the Federal Republic's current account—probably $16 billion in 1980, and presumably still more than $10 billion in 1981—is compelling enough to warrant every effort to reassure international capital. These efforts must be suited to confirm the expectation that similarly high deficits are soon going to be a thing of the past; efforts undertaken by fiscal policy—low increase in expenditures, changes in the spending structure to encourage growth—as well as by wage negotiations—low pay increases.

Were these efforts not to be made, financing the deficit would cost dearly and would have to be attempted at an exchange rate strongly depreciated in real terms, which would contribute to the importation of ever higher prices into the country. The United States, while so much less dependent on foreign trade than the Federal Republic, has gone through painful experiences in this respect when her current account showed steeply rising deficits. The German Central Bank has therefore refused to consider tolerating a significant real devaluation of the German mark, and has observed a monetary policy which permitted at least the stabilization of the exchange rate of the D-mark in spite of enormous balance of payments deficits.

Beyond monetary policy

It has thus prepared the ground for the foreign exchange markets to return to the old conviction: the hard domestic value of a currency is matched by its hard international value. The D-mark's fundamental need for continued revaluation, after all, stems from the unsolved inflation-related problems in other countries. No significant change in the Central Bank's basic monetary policy must be expected before the movements of exchange rates, following once again the international disparities in inflationary development, have restored the confidence in the exchange rate mechanism.

"To be able to avoid increased deficits, the growth in public spending next year must be kept to an absolute minimum . . ."

Thus, the Federal Republic, in spite of her good track record in the fight against inflation, is hardly more strongly disposed than other countries to adopt in her monetary as well as her fiscal policy a course of economic expansion even though predictions for 1981 are unfavorable. But, surely something can be done to prevent the risk of a recession! It certainly can. Their hands tied, especially where costly and by now exhausted possibilities of demand management are concerned, the politicans now turn to the collective wage negotiations for a solution. They are hoping for a significant dampening in the climb of wages to come to the help of cost levels, the essence of supply conditions in an economy.

This hope is justified. And yet, it is also to be hoped that—with or without international accord—the politicians will come up with stronger incentives for the private investor than are currently offered by the market. It goes without saying that these incentives should be related to supply policy. This approach may require more patience than a policy of additional government

spending and permissive increasing of the money supply. But it is common experience that only supply management can solve structural problems without bringing on the risk sooner of later of either inflation or recession.

Is an international accord indispensible? Any economic policy must serve a country's own needs. But this should not amount to solving problems by exporting them (beggar my neighbor). What made economic policy based on demand management so attractive was that it seemed to allow the conjunction of both—until everyone found himself in a sea of worldwide inflation and discovered that the problems had not been solved but merely postponed. Economic policy promoting supply is geared to competitive conditions and, in this way, also to being ahead of others in solving problems, which undoubtedly can also imply an advantage at the expense of others. But as in all market economies relying on competition, maximization of the volume of profitable production is lastly the salient point—providing that only fair means are used in the fight.

The tool of supply policy is fair when globally applied. It does not make a distinction between the domestic market and foreign markets. Nor does it engage in the manipulation of exchange rates for competitive purposes. It is very well possible that supply policy, in an environment of international competition, results in the neglect of the deficit in one's own balance of goods and services. This alone, however, would be no proof of failure. The country that can offer sound supply conditions and that engages in high and profitable investment will also have a good credit rating. ■

DEUTSCHE ZUSAMMENFASSUNG

"Supply policy", eine Wirtschaftspolitik der Angebotsfoerderung, ist nach Auffassung des Autors die richtige Antwort auf die von Geldwertschwund und Leistungsbilanzdefiziten ausgehenden Herausforderungen der achtziger Jahre an die Industrielaender. Die Wirtschaftspolitik des "demand management", der Nachfragesteuerung, fuehrt langfristig nicht aus Inflation und Rezession heraus. Die besonders durch die hohe Oelrechnung, aber auch durch hausgemachte Inflationsschuebe gestellte Anpassungsaufgabe muss daher heissen: weniger konsumieren, mehr investieren, mit verbesserten Produkten konkurrieren und damit die Oelrechnung bezahlen, statt sich stunden zu lassen. Die Bereitschaft zur Inflationsbekaempfung findet in der Welt zunehmend Anhaenger, die ebenso wichtige, wenn nicht noch wichtigere Verbesserung der Investitionsbedingungen durch eine moeglichst globale Investitionsfoerderung, - auch und besonders von staatlicher Seite, selbst unter Inkaufnahme voruebergehend wachsender Defizite - wird dagegen weitgehend uebersehen. Der Verfasser meint, dass noch immer zuviel von konjunkturellen Problemen die Rede ist und zu wenig von den Aufgaben struktureller Anpassung und Erneuerung. Er sieht die fundamentalen Angebotsbedingungen einer Volkswirtschaft geschwaecht, die Bereitschaft und Faehigkeit zum Risiko, die Flexibilitaet in jeder Hinsicht sowie die Anpassung der Einkommensansprueche an das, was erwirtschaftet wird. Der Autor schlaegt allen Regierungschefs vor, sich fuer eine Politik der massiven Investitionsfoerderung einzusetzen, dabei einer stabilitaetsorientierten Geldpolitik nicht in den Arm zu fallen und der Versuchung zur Senkung der allgemeinen Steuern zu widerstehen. Fuer die Bundesrepublik Deutschland uebersieht der Verfasser dabei die bestehenden Probleme nicht. Hohe Defizite in den oeffentlichen Haushalten, eine voellig ungewohnte Passivierung der Leistungsbilanz von spektakulaerem Ausmass und die grossen Schwierigkeiten bei der Verringerung der Abhaengigkeit vom Oel. Der Verfasser empfiehlt verstaerkte Werbung um das Vertrauen der internationalen Geldanleger durch Anstrengungen in den Bereichen der Finanz- und der Lohnpolitik, wie geringere Steigerung der oeffentlichen Ausgaben, wachstumsfreundlichere Ausgabenstruktur und schliesslich auch geringere Lohnsteigerungen.

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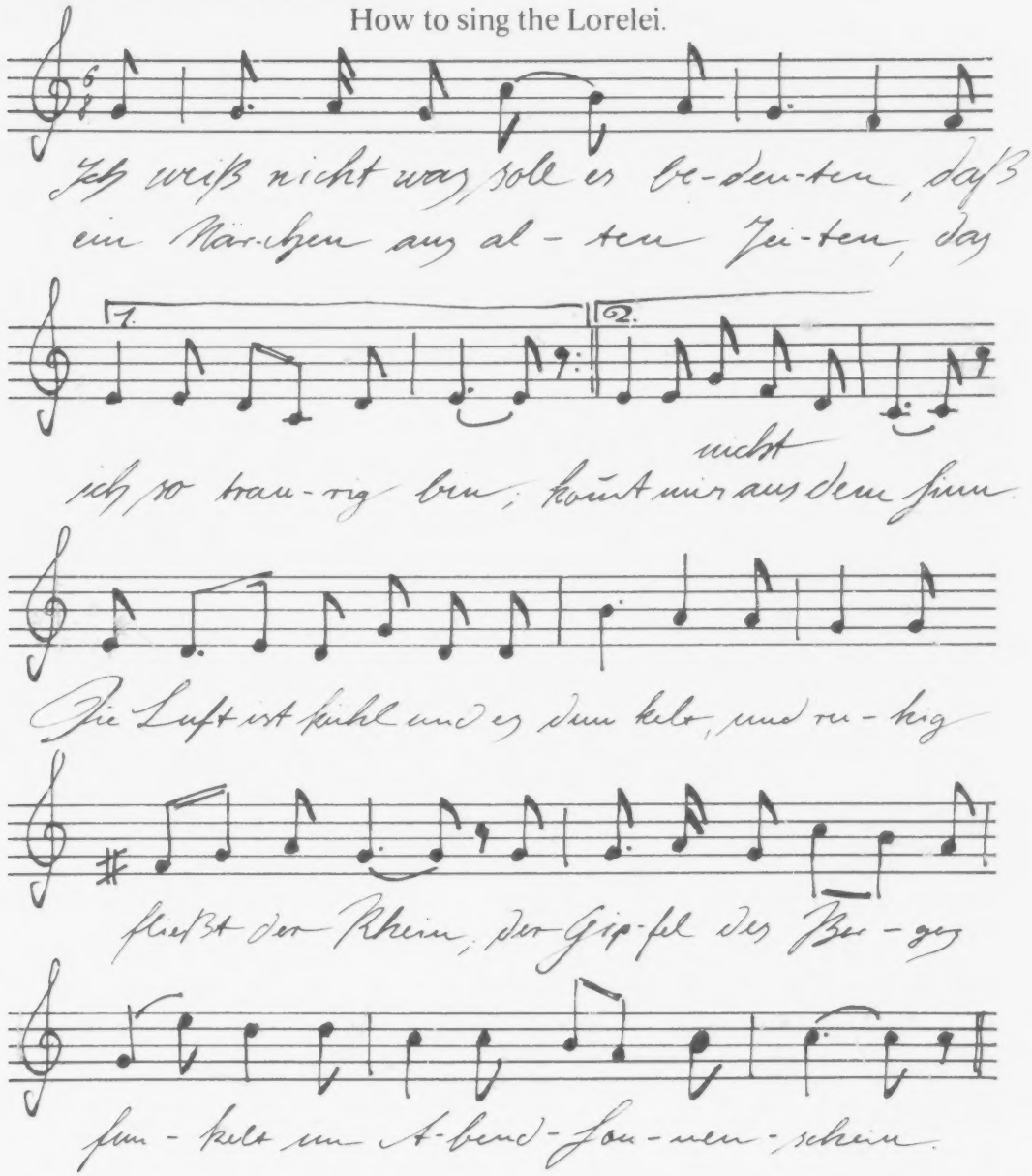
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Walling Out the Future and Burning the Past

by Walter B. Wriston
Chairman,
Citibank / Citicorp

According to a legend of uncertain origin, the same emperor who ordered the construction of the Great Wall of China also decreed the burning of all books in the kingdom written before his accession to the throne. Having established through these policies absolute rule over both the past and the future, the emperor presumably enjoyed restful nights and peaceful days and may even have congratulated himself for having devised a means for starting history anew.

In the ninth decade of the twentieth century, such heroic measures are no longer available to the nation-states of the world. And yet, in the face of a revolution in communication technology that has reduced time, space and transmission costs to fractions of their historical proportion, a number of sovereign states on several continents are enacting, or about to enact, "Wall and Book" policies that control and limit the streams of data and information crossing their borders in the form of electron or electronic impulses.

It is becoming almost a truism that governments might well detect in the new technology of communication and information a profound challenge to their sovereign power, and a force that makes certain notions of compartmentalized national economies obsolete. Imagine: in the 16th century, the fastest regular service that money could buy carried mail from Rome to Madrid in 24 days (as long as the message was sent between April 1 and September 30; at other times it went more slowly), and the estimated time diameter of the entire 'world economy' of 1550 or so was 60 days' travel — at breakneck speed.

Today, by contrast, the announcement of a new fiscal or monetary policy in Washington or Bonn is heard in London or Tokyo within seconds, and the market's judgement of the new policy, as seen in the adjustment of currency cross rates, comes almost as quickly. In effect, the worldwide communications revolution has imposed on all modern governments a discipline not unlike that of the gold standard. Less harsh, perhaps, but in the end just as certain. Laws enacted to control the flow of data across national borders often resemble Chinese Walls built to insulate local markets from the instinctive wisdom of what is, whether we like it or not, a cohesive global financial system.

> ***"... the estimated time diameter of the entire 'world economy' of 1550 or so was 60 days' travel at breakneck speed."***

Laws "protecting" data pertaining to individuals are already on the books in Germany and a number of other European nations. Elsewhere, some statutes require licenses for the transmission of data across national borders, or stipulate that the results of the processing of data must be maintained in-country. Other types of regulations, such as those scheduled to take effect in Germany next year, may establish standards causing international data processing service bureaus to use public data networks rather than private leased lines, even if those leased lines are more efficient.

From an international banker's point of view, the trend seen in many nations toward greater control of cross-border data flows raises troubling issues. Look first at a micro-economic example: in the past few years, it has become abundantly clear that the classic intermediation role of financial institutions has changed in some fundamental ways. This change is suggested concretely, if unwittingly, in a newly-opened wing of the Metropolitan Museum of Art in New York. There, shielded by glass from the further ravages of time, stands the facade of a bank that once did business on Wall Street. Banks have not yet become museum pieces, but bankers can no longer afford to wait in stately edifices for customers to bring in deposits, and then wait for other customers to come seeking loans.

Today the emphasis is on delivering a wide range of services of which credit is only a part. Banks have always been in the information business—knowing where there's a supply, and where there's a demand, and helping to make a match. And where local laws restrict the ability of international banks to manage and provide information in its many forms (money being just one), it is not merely the costs and efficiencies of specific services that are at stake. In a much broader sense, what is at stake is the ability of financial institutions to perform their historic role of helping to allocate limited resources across global markets.

In fact, the same technology that has made it possible for international banks to carry out this function with unprecedented proficiency has also made the world a community in the literal sense of the word. Not everyone likes the idea of an integrated international financial and informational marketplace capable of moving money and ideas to any place on earth in minutes. The argument that the increased mobility of money undermines or complicates national monetary policies has become a common cry. Behind that argument, however, may lie the real problem: that a global financial

marketplace disciplines nations that indulge in overexpansionary policies. Similarly, it is not at all beyond the realm of possibility that laws ostensibly enacted to protect privacy—in itself a very worthy cause—could also be used to control the flow of capital.

The issue is not that the nations pursue indulgent economic policies, or that they are devising subtle means to control capital movements, but that every step in these directions,no matter how innocently taken, may ultimately result in abridgements of what might be termed economic free speech. The underlying tension between the international banks of the world and all governments is nothing new, but the tendency of governments to respond to the tension with regulatory solutions may lead to consequences on a scale never seen before. Many of these regulatory so-called solutions are aimed at the heart of the global financial system, the Eurocurrency markets. While it represents a more or less spontaneous response to misguided regulatory efforts, particularly on the part of the U.S. government, in the aftermath of the OPEC oil embargo, the Eurocurrency market nevertheless managed to transfer the greatest sum of financial assets in the shortest time frame in history. Now in the face of another round of OPEC surpluses, the Eurocurrency market is again displaying the strength and resiliency that can result only from decisions made on the basis of freely available information. This success could not be achieved in an environment of regulation and restricted information flow.

> ***"The revolution in communication technology is precisely what has made the efficiency of the Eurocurrency market possible."***

The revolution in communication technology is precisely what has made the efficiency of the Eurocurrency market possible. For without the rapid flow of information between borrowers and lenders, no matter how widely separated, it would be impossible to make the decisions on which the market's performance and responsiveness depend.

Bankers have always had a special appreciation for the tangible value of information. Look back again to the 16th century, this time to read part of a letter written by a French government official stationed at the court of the Spanish king, Philip II. He complains that while mail between the Genoese bankers in Lyons and

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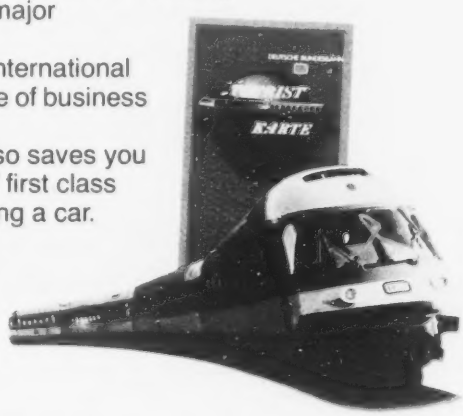

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Madrid arrives in record time, the dispatches he awaits from his king are still somewhere out on the highway.

The complaint sounds familiar. In fact, it's merely a precursor of the current debate over the flow of information. What is decidedly different today is the fact that banks and governments alike have become members of, and are responsible to, a community of interests and needs that transcends national boundaries.

> ***"Increasingly, we see clearly that the world's resources are limited."***

Operating as local banks with local personnel in local markets, and at the same time functioning as international payments facilitators and intermediaries, international banks are still in the same business that they have always been in: helping to channel resources to where the need and the demand are strongest. Increasingly, we see clearly that the world's resources are limited. What we don't see as clearly is that today's information technology provides the international banking system with tools for allocating those resources faster and more efficiently than at any time in history.

For an international bank, then, wherever it operates, no issue has greater long-term significance than its right to use this technology to carry out its historical mission. The danger is that regardless of the ability of the international financial system to meet the world's needs, more walls will be built. The fact that these new walls appear to impede nothing but the flow of electrons should not blind us to the fact that what they really represent is merely one more chapter in the ancient struggle to control the international flow of capital. ■

DEUTSCHE ZUSAMMENFASSUNG

profile 10—Walter B. Wriston

Der Verfasser plaediert fuer einen moeglichst ungebremsten Daten-und Informationsfluss im Bankwesen —auch ueber Landesgrenzen hinweg. Die entsprechende Gesetzgebung haelt seiner Auffassung nach mit den technischen Moeglichkeiten der Nachrichten—, Daten— und Informationsuebertragung laengst nicht mehr Schritt. Schon kann sich kein Land und keine Institution mehr voellig von der Aussenwelt abschliessen. Dennoch versuchen zunehmend mehr Laender, auch die Bundesrepublik Deutschland, durch entsprechende Gesetze den Informationsfluss zu kontrollieren, zu bremsen oder unter Umstaenden sogar zu unterbinden.

Gerade im wirtschaftspolitischen Bereich spielt aber der schnellstmoegliche Informationsfluss eine wesentliche Rolle. Die neuesten finanzpolitischen Entscheidungen aus Washington oder Bonn sind Sekunden spaeter in London oder Tokio zu vernehmen. Die freie Moeglichkeit zur sofortigen Reaktion muss gewaehrleistet sein. Doch in vielen, insbesondere europaeischen Laendern erlassene oder in Vorbereitung befindliche Gesetze auch auf dem Datenschutzgebiet, behindern allzuoft den freien Kapitalfluss und damit die Moeglichkeit, Gelder da abzurufen, wo sie im Ueberschuss vorhanden sind, und dorthin zu transferieren, wo sie gebraucht werden. Gerade die wachsende Bedeutung des im ganzen erfolgreichen Eurodollarmarktes zeigt die Notwendigkeit schneller Daten—und Informationsablaeufe im Bankwesen.

Ohne beschleunigte Nachrichtenuebermittlung waeren internationale Stuetzungsaktionen zu Gunsten bestimmter Waehrungen im heutigen Umfang und mit der noetigen Schnelligkeit nicht moeglich. Der Autor wuenscht sich flexiblere Geldmarktregeln und einen Abbau von Kapitalkontrollmechanismen, so dass ein Schritthalten mit der schon vorhandenen Transfer—und Kommunikationstechnologie ermoeglicht wird.

"Half of Germany's top 10 banks are Frankfurt-based. We're one of them."

Let's start with Frankfurt. Why is Frankfurt so important?

"Frankfurt ranks among the world's foremost banking and financial centers. 150 German banking institutions operate here, and Frankfurt has 174 international banks, more than any other city in Continental Europe.

The Bundesbank is headquartered here, and the Frankfurt Stock Exchange is Germany's largest, accounting for nearly half of the stock exchange transactions, 64 per cent of dealings in foreign shares and 80 per cent of the business in foreign fixed-interest securities.

Perhaps less well known internationally is that Hessische Landesbank is one of Frankfurt's big native-born banks. Half of Germany's top 10 banks are Frankfurt-based. We're one of them."

Now about the bank itself. What's its size and structure?

"With total assets of DM 49.2 billion, Hessische Landesbank is Germany's 9th largest bank, 3rd among Landesbanks. As a government-backed regional bank, our liabilities are guaranteed jointly by the State of Hesse and its Sparkassen and Giro Association. We also act as banker to the State of Hesse, from which our name is derived, and perform clearing functions for the 52 regional Sparkassen".

What about your service facilities?

"We concentrate on wholesale banking and medium to long-term fixed-rate DM lending. As a German universal bank, our facilities cover the full range of commercial and investment banking services. Because we don't operate a branch network, we can devote our time and energy to wholesale banking activities.

In recent years we have strengthened our participation in international issues. And we provide comprehensive investment management and brokerage services, including securities trading. Our membership of the Frankfurt Stock Exchange facilitates dealing in quoted shares and fixed-interest securities."

And sources of funds?

"A large part of our funding is done by issuing bearer bonds and SD Certificates (Schuldscheindarlehen). The total in circulation is about DM 21 billion"

Who are the bank's main clients?

"As a wholesale bank, our service facilities are tailored for large, internationally active corporations, foreign governments, and other financial institutions, as well as subsidiaries of international companies operating in Germany. As bankers to the State of Hesse, we naturally support its state-wide and municipal programs. We also work closely with Hesse's Sparkassen and their clients, especially on the foreign side."

How do you see your position developing internationally?

"Frankly, a number of German banks offer similar high-quality services, and some of them have a head start on us in the international field. Without neglecting our home base in Frankfurt, we have assembled a team of banking professionals devoted to building a strong international track record based on pragmatic banking principles, the most modern technical and support facilities, and the highest standards of client service. Banking in Frankfurt is quite competitive, and the banks who try harder for their clients and give them fast, personal service often have the edge. This is one of our major objectives."

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The Banking Environment in the U.S. and Germany: A German View

by Dr. Manfred Meier-Preschany
Member of the Board of Managing Directors, Dresdner Bank AG

Obviously, historical patterns and economic developments in the United States and Germany are so different from one another that it would be indeed surprising if the banking structure and the environment in which banks have to operate in either country did not depict these past and current differences of the two economies.

The relatively early industrialization of the United States, the "new frontier" mentality, the Westerner's suspicion of the Eastern financier, the country's insular outlook and vast raw material resources have produced a banking sector which is uniquely American and, at first, often rather difficult to grasp for foreigners.

In contrast, Germany's relatively late entry into the ranks of industrial nations, its lack of natural resources, high population density, and political fragmentation have created a banking community which is peculiarly German, yet bears some resemblance to banks in neighboring states.

In fact, if one were to characterize the differences between the banking structures of the two countries, this would probably boil down to basically two different philosophies, namely, concentration vs. "segmentation."

> ***"The American "segmentation" philosophy found its geographic expression in the absence of a nation-wide branch system."***

The American "segmentation" philosophy found its geographic expression in the absence of a nation-wide branch system. This aspect of American banking can be explained and understood by foreigners only if seen in the historical context and evidences an ingrained distrust of anything large, particularly if it is associated with money. Germany never experienced this kind of antipathy to bigness or to big money per se; to the extent that animosity toward banks arose in Germany—and it still does—it tended to be of a political and ideological nature.

It is therefore only natural that the United States to this day does not have a "central" bank like Germany and the other European nations, where the word "centralization" historically never was viewed with that suspicion many Americans are wont to see when their states-rights are endangered. The

establishment of the twelve independent Federal Reserve Banks was thus entirely in keeping with the anti-centralist philosophy permeating U.S. society. In the business area, the strict American separation between "commercial" and "investment" banking is confronted in Germany by the opposite concept of the "universal" bank which unites under one roof all kinds of financial services required by customers.

I believe I am correct if I state that both forms of organizing a banking community have stood the test of time. Neither has the U.S. system of "segmentation" hindered the development of large international banks, nor has Germany's "universal" bank system created monopolistic, all-powerful financial giants. In the U.S. and Germany, the three largest privately held banks account for roughly ten per cent of loans extended (to the non-bank sector). However, whether or not the United States will be able to maintain this measure of fragmentation in the banking sector into the future remains to be seen. Political, economic and institutional forces at work would suggest that a greater liberalization may bring about as yet undreamed of changes, and thus greater concentration.

No doubt, the appearance of foreign banks on the American banking scene has tended to give new impetus to the development toward a nationwide branch banking system and, quite possibly, a greater range of services to be offered.

I would be exaggerating if I maintained that the basic divergence in the banking system of the two countries is causing an unsurmountable problem to German banks. American banks have learned to live with this limitation and so will we. Actually, to a foreign banking institution in the United States, which so far has largely concentrated on servicing national companies, the

restriction on crossing state lines has been more of a nuisance than a real problem, particularly if—like Dresdner Bank—it belongs to the fortunate few which located branches in more than one state when it was still possible.

I am certainly not arguing for retaining a system which at one time may have served a purpose, but which in these days of international financial integration has seemingly outlived its usefulness. However, it has not been a serious handicap to foreign banks until now. According to recent data, 189 foreign banks had offices in the United States in 1979, with total assets of $161 billion. Even if this figure is correct, barely 7% of the combined total assets of U.S. commercial banks, savings and loan associations, mutual savings banks and credit unions would be "controlled" by foreign institutions.

A comparison with Germany would show

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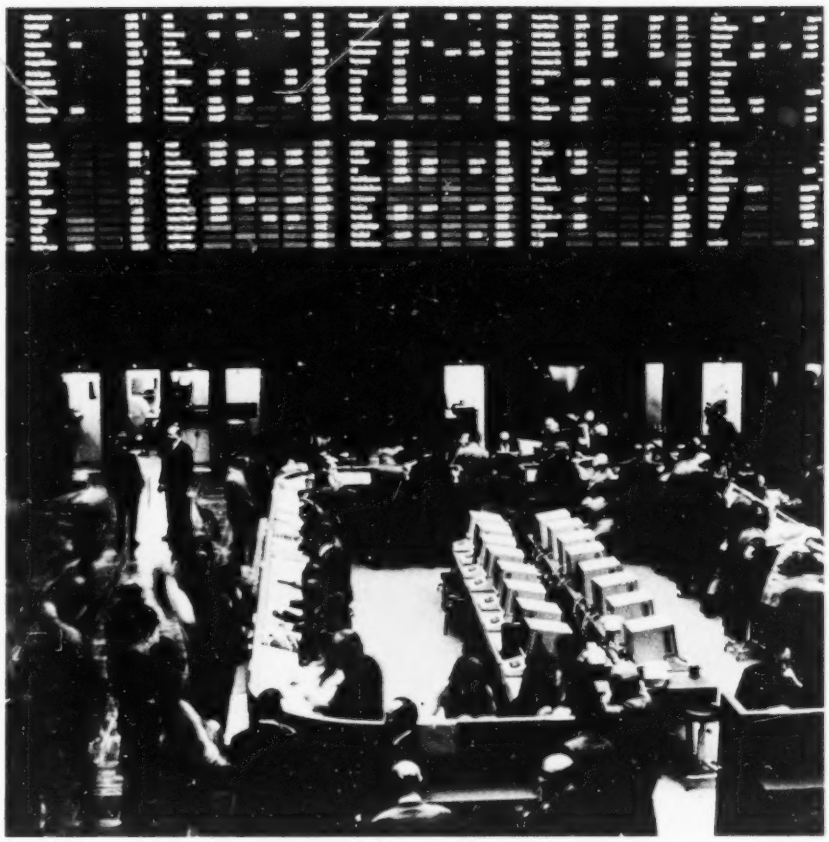

that the German financial community has a considerably smaller stake of foreign "controlled" bank assets—less than 2% as of the end of 1979. The reasons, of course, are manifold. For one, the very structure of the German banking system with only a handful of large privately-held commercial banks, a number of medium-to-large-size regional banks, the considerable importance of semi-public and public saving banks, central giro institutions, credit cooperatives, public mortgage banks and so forth make it rather more difficult—despite probably the most liberal banking legislation in the world—to gain a foothold in the German banking market.

Although the relative foreign stake in the financial community thus may show large proportionate differences, the actual impact of foreign banks still is rather small in both countries. Unfortunately, the practice is only too common to use figures of large foreign shares of specific financial market segments—for instance, 15% of all large commercial and industrial loans in the U.S. are said to be extended by foreign banks—as an indication of the activities by foreign banks. The fact that commercial and industrial loans account for only about one-third of all loans granted, that the large loans among them in turn are only a fraction thereof and that the awesome fifteen per cent refers to that rather small market segment is piously forgotten. Whatever the absolute volume of loans extended by foreign institutions in the United States is, it seems certain to be far less than the 7% share of total banking assets "controlled" by foreigners. This constellation would correspond to a very similar relationship in Germany, where foreign banks account for about one per cent of the loans extended to non-banks, a percentage which is only half as large as the share of total banking assets "in" foreign hands.

Also, we must not overlook the fact that the D-Mark's recent junior role as a reserve and trading currency is many times inferior to that of the dollar. In other words, with the dollar as the world's most important trading and financing currency it is only natural that foreign banking institutions will show a considerably greater interest in a banking presence in the United States as compared to Germany. Today, 80% of the world's foreign exchange reserves are denominated in dollars, and most of the world's commodities, in particular petroleum, are also quoted in dollars. The D-Mark, in contrast, probably accounts for little more than 10% of the world's foreign exchange reserves and even German imports are invoiced to only about 50% in D-Marks.

If one combines these advantages of the dollar with the huge consumer market and the world's most sophisticated and voluminous credit and capital market, the difference in attractiveness between the U.S. and German financial system becomes enormous. In dollar-volume, the funds raised by the non-financial sector were three times larger in the U.S. than in Germany and in the case of capital mobilized through bonds (corporate and government) and equities 4½ times.

The attractiveness of the American financial market is heightened by the very favorable social and political climate in which banking is conducted in the United States. By and large, banks are thought of in

"... the German banking community is subject to considerably greater social and political constraints than is the case in the United States."

the United States as just another part of the business community whose objective—long-range, at least—should be to achieve a respectable profit margin. In Germany, though, as in some other European nations, some ideological ballast of the past century still has not been entirely dumped in favor of a more enlightened liberal concept of the function of profits.

This is to say that the German banking community is subject to considerably greater social and politicai constraints than is the case in the United States.

Possibly, this is the price to be paid for the much greater public exposure of the German banker which may, to no small degree, be due to the "universal" nature of German banking. Whereas in the United States the anonymous market decides upon the chances of survival of a given stricken company (at least, before Chrysler), in Germany that decision was often made by the company's bank. A large share of industry equity capital owned by German banks was indeed gathered in days when a company was faced with a difficult financial

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situation and only the bank's intervention by means of taking over part of the equity capital and installing a new management ensured its survival. If we consider that the capital base of German industry has been traditionally much lower than in the United States, the greater political exposure of the German banker and, vice versa, his greater vulnerability, becomes obvious. The public, after all, easily forgets that a bank's intercession once rescued one or another important enterprise with thousands, even tens of thousands of jobs at stake. All that remains in the public eye is the more or less significant share in the equity of national companies held by the banks. Problems of this nature are simply unknown to the American banker.

In conclusion, I would say that the main differences between U.S. and German banking are not those attributable to the structure per se, large as they may be, but those of the environment. After all the banking system itself is a product of its environment and it will change as the environment changes. ■

DEUTSCHE ZUSAMMENFASSUNG

Der Verfasser stellt die fundamentalen, zum Teil historisch bedingten Unterschiede dar, die, von dem jeweiligen sozialen Hintergrund ausgehend, die Umwelt fuer das Taetigwerden der Banken in den USA und in der Bundesrepublik praegen. Er analysiert, wie sich aufgrund dieser Umweltbedingungen unterschiedliche Banksysteme entwickelt haben, gepraegt von "concentration" in Deutschland, von "segmentation" in den USA. Der Autor kommt zu dem Ergebnis, dass sich beide Systeme im Laufe der Zeit in ihrer speziellen Umwelt bewaehrt haben. Zum Thema Macht der Banken weist der Verfasser auf das mit dem amerikanischen Misstrauen gegen jede Machtkonzentration erklaerbare Fehlen einer "Zentralbank" in den USA hin, wo 12 "Federal Banks" operieren. Auch gibt es in den Vereinigten Staaten keine "Universalbanken", die fuer alle Arten des Bankgeschaeftes zustaendig waeren, so wie wir sie in Deutschland kennen.

Des weiteren bespricht der Autor die Einfluesse des Auslandskapitals im jeweils anderen Land, nennt die unterschiedliche Anzahl der auslaendischen Bankniederlassungen in den USA bzw. der Bundesrepublik und erlaeutert die Gruende dafuer. Danach bestehen wesentlich mehr deutsche Bankfilialen in den USA als umgekehrt. Unter anderem haengt dies mit dem wesentlich groesseren Marktpotential in den Vereinigten Staaten, der dortigen positiven Einstellung zum Profit und der besonderen Rolle des US-Dollar als Leitwaehrung zusammen. Bei Besprechung der unterschiedlichen Einstellung der Oeffentlichkeit gegenueber den Banken in den USA und in der Bundesrepublik geht der Autor auch auf die besondere Rolle deutscher Banken als Teilhaber an Industrieunternehmen ein und unterstreicht ihre Bedeutung als Sozialpartner.

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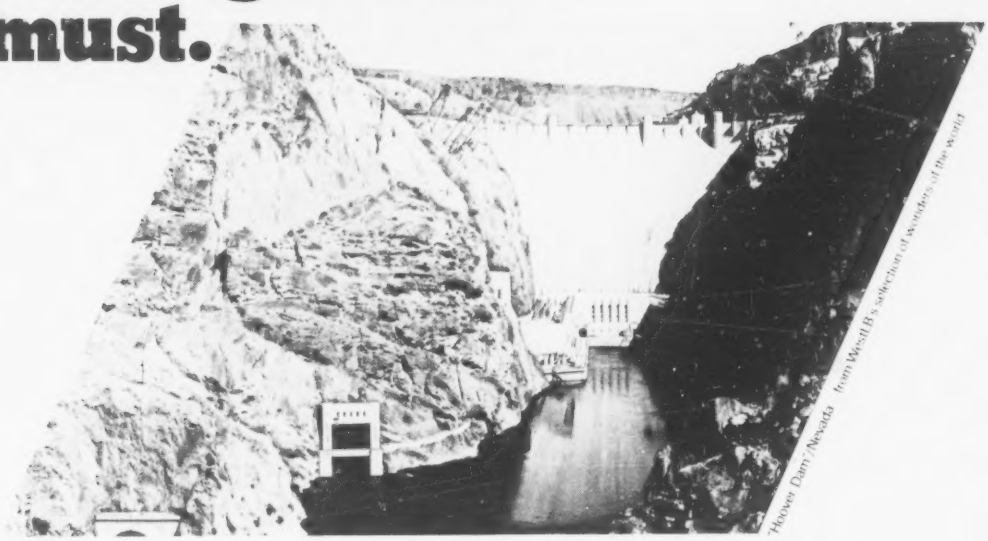

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Business Downturn Moderates

by Dr. Irwin Kellner
Senior Vice President and Chief Economist, Manufacturers Hanover Trust Company

Returning recently from a lengthy business trip, I felt like Rip Van Winkle reincarnated. Washington Irving's legendary character, you may recall, went to sleep one day and did not awaken until 20 years later. When he did, he quite naturally found the world significantly changed from the way it was when he last was awake.

When I embarked on my trip, the business climate was dreary and getting worse at an alarming pace. In an effort to dampen inflation and the expectation of inflation, the Federal Reserve had earlier slammed on the monetary brakes, sending interest rates soaring to record levels and causing consumers to cut back their spending severely in the mistaken belief that credit was no longer available. Needless to say, this caused the "real" gross national product in the second quarter of 1980 to contract by an annual rate of 9.1 per cent—equal to the worst quarterly decline in the postwar era recorded in first-quarter 1975.

Not surprisingly, many economists, including myself, became alarmed at the rate at which the economy was descending. There were widespread calls for changes in the policy mix, ranging from my recommendation that the Federal Reserve take its foot off the monetary brakes (by removing credit controls and increasing the growth rate of the money supply), to others' views that the government should also step on the fiscal accelerator by cutting taxes and/or increasing spending. Judging by the way the economy appears to be behaving now, I think that the release of the Fed's foot from the monetary brakes may well turn out to be enough. Maybe it's the "Rip Van Winkle" effect, but I detect a distinct change in the economic climate in only about a month's time.

This is not to imply that I think the recession is over, and from here on out the U.S. economy will be expanding. I still believe that we've got several quarters left of economic decline ahead of us. But in terms of the magnitude of the decline as well as the major contributors to it, things will be different in the second half of the year than they were in the second quarter, so you should factor this into your decision making.

"Not surprisingly, many economists, including myself, became alarmed at the rate at which the economy was descending."

Like the plants around the Washington State volcano, Mount St. Helens, that began pushing their way through the ash soon after the eruptions, the seedlings of future economic recovery are popping up now in the wake of the devastation wrought by the second quarter's steep drop in economic activity. For one thing, as consumers stopped spending, they paid off a large chunk of their installment debt and began to rebuild their savings. The decline in consumer credit outstanding in April and May, $5.4 billion, along with the upturn in the second quarter's savings rate to 4.7 per cent from 3.7 per cent in the first quarter, has gone a long way toward restoring the consumer's balance sheet to a more normal condition.

"By taking its foot off the credit brakes . . . the Fed has gone a long way toward helping moderate the economic decline."

Ordinarily, such a restoration might have taken several quarters to accomplish, thus prolonging the period during which consumers would stay out of the marketplace. Under those circumstances, of course, business would cut back its operations, laying off workers and adding to the intensity and the duration of the recession. But because many people misunderstood the Fed's credit restraint program, thinking no credit was available at all and that existing obligations should be paid down ahead of schedule, they accomplished this restoration in a matter of months—if not weeks. Thus, when the inevitable price cutting that always follows an unintended buildup of unsold goods got underway, people were able to take advantage of these discounts and step up their pace of spending almost immediately.

"From the point of view of spurring consumer spending, this slowing of inflation . . . could not have happened at a better time."

You could see this cautious return toward spending in some recent statistics. Sales of single-family homes rose in May compared with April, seasonally adjusted, after having fallen during the previous three months. New-car dealers reported that sales in June did not fall any further from May's levels, seasonally adjusted, while they actually picked up a bit in early July. The Commerce Department says that housing starts rose sharply in June compared with May, seasonally adjusted, while permits issued for future new-home construction advanced for the second month in a row. Finally, total retail sales advanced in June, both in current dollars and after taking out the effects of inflation.

Much of this change in the economic climate traces to another development that accompanied the steep drop in economic activity: a sharp and unprecedented decline in interest rates. At one point, such key money market interest rates as those on three- and six-month Treasury bills were down ten percentage points from their peaks reached just several months earlier. Such a steep decline has several implications. For one thing, as representatives of the entire spectrum of short-term interest rates, these steep declines are indicative of an improved availability of credit at a much lower cost. Obviously, this makes borrowing easier for businessmen and consumers.

In particular, the decline in Treasury bill rates helped the thrift industry by reducing the incentive for people to withdraw their funds from savings accounts and invest them directly in money-market instruments. Known as disintermediation, this process has afflicted the mutual savings banks and savings and loan associations at this point in every postwar business cycle, drying up the funds they have for making mortgage loans. I would not assert at this time that the thrifts are either willing or able to get back into the mortgage-lending business in a big way, but the early reports of renewed deposit inflows, along with the development of such new instruments as the five-year renegotiable mortgage suggest that some further improvement in the pace of residential construction lies ahead.

By taking its foot off the credit brakes in the form of dismantling its program of selective credit controls, the Fed has gone a long way toward helping moderate the economic decline. Early evidence suggests that retail sales are beginning to benefit from the consumer's renewed access to credit. Needless to say, these are largely big-ticket items—the very goods that suffered severely because of earlier cutbacks in consumer spending, then were aggravated by the Fed's

credit controls. While rising unemployment may generate continued caution with regard to spending, I think that the renewed availability of credit will begin to tempt more and more people to return to stores and try to take advantage of the growing number of bargains that is developing as merchants discount prices in an effort to move unsold goods.

This tendency to cut prices has produced a noticeable slowing in the rate of inflation. After rising at a compound annual rate of nearly 18 per cent in the first quarter, consumer prices went up at a much more moderate 11 per cent clip in the second quarter—returning to a single-digit rate of rise in June. From the point of view of spurring consumer spending, this slowing of inflation (with many prices actually falling) could not have happened at a better time. This is because the consumer, increasingly aware of the existence of recession, has adopted a new posture distinctly different from the one that he and she have held for the previous two years.

Throughout most of 1978 and 1979, the prevailing attitude among many consumers could best be characterized by the phrase, "buy now before prices go up later." Originally encouraged by the speed with which prices of new cars and new homes went up in spring, 1978, this attitude soon spread to purchases of other goods as people concluded that the government was either unwilling or unable to do anything substantive to slow the rate of inflation, and thus their only recourse was to buy goods before their prices went up. However, the process of buying to beat higher prices must eventually result in people outspending their income flows, causing a cutback in savings. Nationwide, the savings rate plunged from five per cent by the end of last year. This represented a low equalled only during the early stages of the Korean War, when people rushed to buy goods fearing a repetition of the widespread shortages that characterized World War II.

Many people soon found it expedient to go heavily into debt. They evidently figured that, besides the "benefits" of buying before prices went up, they would be repaying their loans with dollars cheapened by inflation and that the interest rate incurred was a tax deduction, further reducing the effective cost of borrowing. Needless to say, the typical family at yearend 1979 found itself saddled with an unprecedented amount of debt relative to its ability to repay.

At the turn of this year, consumers shifted to a mood of retrenchment in an effort to shore up their savings and reduce their debt burden. This turned into a "buy later" attitude when people saw the effects of the Fed's March 14 policy of credit controls on their own purchases in particular and on the U.S. economy in general. Remembering what happens in every recession, but encouraged especially by the rebates announced by the domestic automobile manufacturers as well as some foreign-based producers, the decline in mortgage interest rates and, subsequently, in new-home prices, people started actively seeking off-price sales among a wide variety of goods and services. By the end of the second quarter, these expectations had begun to bear fruit. As merchants responded to the pileup of unsold goods by slashing prices, consumers in turn responded to these off-price sales by returning to stores, producing the rise in retail sales for the month of June that I referred to earlier.

Thus the next few months are likely to bring a dramatic improvement in the inflation rate—at least as measured by the consumer price index. For one thing, recessions always have their effect on inflation for reasons I mentioned above: the widespread discounting that appears whenever unsold goods pile up. This time is no exception, but another reason will be more technical in nature, and that is the way the consumer price index is put together. As should be well known by now, the CPI gives disproportionate weight to new-home prices and mortgage interest rates. When these go up, as they did rapidly from 1978 through the first quarter of 1980, they add unduly to the consumer price index, which, in simplistic terms, assumes that everyone buys a new house each month and pays the current mortgage rate to finance it.

Now that mortgage interest rates are falling and housing prices are coming down, there will be a disproportionate downward pull on the CPI, giving the impression that the rate of inflation is slowing. In addition, the consumer price index uses fixed weights, causing energy prices, a fast riser during the last couple of years, to impart more of an upward bias to the CPI than they should have. Because of the after effects of the steep rise in energy prices last year as well as the recession, energy supplies have become abundant and retail prices have come down a

"Throughout most of 1978 and 1979, the prevailing attitude among many consumers could best be characterized by the phrase, 'buy now before prices go up later'."

bit. This, too, should disproportionately slow the rise in the CPI.

Food prices were set to exert a similar downward pull on the CPI until Mother Nature intervened. The well-documented spell of dry, hot weather in the nation's farm belt has taken its toll on many agricultural commodities. It has killed chickens, forced cattlemen to dump their animals onto the market, withered cotton and is beginning to affect the nation's major feed-grain crops. Some retailers already report having to pay higher prices for many types of foods, a situation that undoubtedly will be reflected at the consumer level before very long. In other words, a faster rise in food prices seems likely to moderate some of the downward pull on the CPI exerted by the forces of recession in general and energy and housing in particular. Still, the consumer price index could rise at rates as "low" as 5-6 per cent for at least a few months in the near future before going up more rapidly once again as the economic slide draws to a close.

"Needless to say, the typical family at yearend 1979 found itself saddled with an unprecedented amount of debt relative to its ability to repay."

When it comes to assessing the position of business inventories, there is much confusion. Inventory data are usually the least reliable of those produced by the government. This is especially so at this point in the business cycle, and especially because current high rates of inflation impact unevenly on inventories and sales. Not too long ago it was fashionable to point out that inventories were in good shape relative to sales, even though the economy was slowing, because the current-dollar ratio of inventories to sales was historically low. However, this has changed in the wake of the steep decline in sales in the past few months. For all business the current-dollar ratio of inventories to sales is now at its highest point since 1976. In "real" terms, taking out the disparate affects of inflation on inventories and sales, the situation is even more worrisome. The I-S ratio for total business is almost as high today as it was during the worst part of the 1973-75 recession.

This may seem to go counter to the prevailing wisdom. Many people would agree that, while there is, indeed, an unintended pileup of inventories, there is not present today the deliberate building up of inventories that occurred in the last cycle. I have no doubt that businessmen have been cautious these past couple of years with regard to inventory levels, since they were given considerable advance notice of this recession and had still in their minds the painful memories of the effects of the deliberate buildup that they undertook during the first half of the last recesssion. However, I would submit that the reason that the real ratio of inventories to sales is as high as it is today is that businessmen are once again being misled by inflation, since it affects sales and inventories at different rates of speed.

What this means is that, intent notwithstanding, there exists a substantial overhang of real unsold goods to real sales. This will have to be worked down in the coming months before output can be expected to turn around and rise. Accordingly, you should anticipate that business, through its inventory-reduction policies, will be responsible for the bulk of the economic declines from here on out, in distinct contrast with the downward pull caused by the consumer earlier this year. However, this does not mean that the economic declines likely to occur in the third and fourth quarters will match the second quarter in intensity since, as I pointed out above, the consumer is already back in the marketplace hunting for bargains. This process will aid businessmen on all levels of production and distribution in working down their inventories.

". . . the reason that the real ratio of inventories to sales is as high as it is today is that businessmen are once again being misled by inflation, since it affects sales and inventories at different rates of speed."

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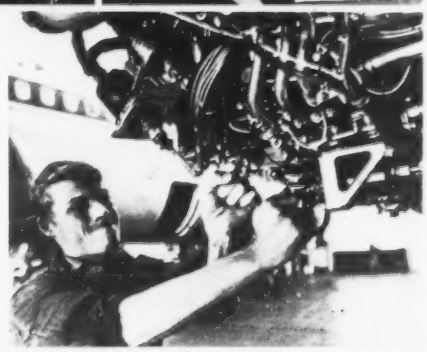

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> ***"To be sure, the real inventory-sales ratio is a lagging indicator."***

To be sure, the real inventory-sales ratio is a lagging indicator. This means that it usually continues to rise well after a recession comes to an end. In the present circumstance, this suggests that inventory liquidation could continue for some time to come. However, it should be pointed out that changes in the economic climate have occurred with unprecedented swiftness in the current cycle. For example, after rising rapidly late in 1979 and in the first three months of 1980, short-term interest rates subsequently fell with equal vigor; after taking on debt at an unprecedented rate in late 1979 and early 1980, consumers paid down debt at record-breaking rates of speed; the drop in many key economic statistics (and the rise in unemployment) was unprecedented in modern times; and the rate of inflation has been cut in two in the space of three months. What I am saying here is that the inventory-sales ratio could fall just as swiftly as it has gone up because of the combination of increased consumer buying and rapid declines in output. If so, it would reduce the time needed to get stocks in line with sales.

The implication from the above that the worst part of the recession may be over should not be taken to mean that the economy will be expanding from here on out. As I noted earlier, I believe that the business sector will take over from where consumers left off by slashing inventories to get them in line with sales. Since interest rates have already come down a considerable amount, sales are beginning to climb, and the expectation of inflation for the long term is for comparatively high rates, I don't think that business will try to squeeze out that last extra drop of inventories. Rather, I think they will merely try to get their stockpiles down to a more manageable level, near-term. That is why I believe that the real GNP will not fall in the third and fourth quarters by the rates of speed that it did in the second.

With automobiles and housing now on the way up, and retail trade in general likely to experience increases before too many months go by, it would seem that the economy should reach its nadir around yearend. Thus, 1981 should, by and large, be a year of expanding economic activity. However, lest you get your hopes up high, let me go down on record as saying that I do not believe that the expansion, when it comes, will be all that noticeable because it will not be all that sharp.

There are several reasons for this. In the private sector, the consumer, having satisfied his and her demands for goods ahead of schedule for the last couple of years is likely to return to a more normal pace of buying in the next couple of years. The demographics of the population may suggest that there is pent-up demand for autos, housing and other big-ticket items, but the very nature of these goods (their postponable quality) makes it difficult to predict flatly when these pressures will generate a renewed burst of spending.

On the business side, because capacity utilization has sunk so low and because large sums of money still must be earmarked for such non-cyclical purposes as cleaning up the environment, making plants safer for workers and goods safer for consumers, and because the tax structure continues to weigh against capital formation, business is unlikely to embark on a capital spending boom any time soon. On the monetary side, the Federal Reserve at best will follow its recent path of keeping the growth in the money and credit aggregates to a rate which over the long run would tend to squeeze down inflation. At worst, the Fed could return wholeheartedly to its policy of manipulating money-market interest rates which, given present depressed conditions, would tend to keep the supply of money and credit growing even more slowly, thus putting more of a lid on the eventual economic rebound.

> ***"In the private sector, the consumer, having satisfied his and her demands for goods ahead of schedule for the last couple of years is likely to return to a more normal pace of buying in the next couple of years."***

It is on the fiscal side that the greatest

restraint is likely to occur. Right now there is much discussion of the need for a tax cut. Such discussions are not hard to understand, since cutting taxes puts more money into people's pockets, presumably encouraging them to increase their outlays, thus ending the recession. However, because of special circumstances that prevail at this time, there is a need to distinguish between actually cutting taxes and simply reducing the tax burden. For unless taxes are cut by substantially more than is now being discussed, the actual tax burden on most people will rise significantly in 1981.

There are several reasons for this. The first is the fact that inflation pushes us all into higher tax brackets. Since our tax structure is "progressive," a higher tax bracket means a higher tax rate (percentage of income). With no change in present tax rates, the upward warp brought about by inflation will produce an extra $20 billion in Federal revenues next year. Then there is the projected increase in Social Security taxes. Under present law, Social Security taxes will go up by $17 billion on January 1, 1981. The reason for this rise is that Social Security taxes must cover the increased benefits that the system pays out, and benefits have risen sharply in recent years because they are indexed to the rate of inflation. Add to this the $15 billion or so that the government is likely to take in next year because of the "windfall" profits tax on the oil companies, and you come out with an increase in the tax burden exceeding $50 billion, if present laws remain unchanged.

"... there is a need to distinguish between actually cutting taxes and simply reducing the tax burden."

This kind of tax increase would restrain significantly the economy's ability to recover from today's recession. It might keep the unemployment high for a considerable period of time and sales and profits sluggish. However, if there are signs that the recession has bottomed out by the turn of the year and a recovery is underway, policy makers might be wise to avoid cutting taxes at all. This is because of the long-run considerations of balancing the budget which must still be kept in mind. Plainly, the more taxes are cut and/or spending increased, the further away we will move from the path of a balanced budget. And as I have said time and again, the only way we are going to make any

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fundamental progress against inflation is for Washington to balance its books so that the Federal Reserve can keep the growth rate of money and credit down to a rate not exceeding the economy's ability to produce real goods and services.

All of this goes back to what I said in June. What may appear to be economics (and even worse, politics) for the shorter run, makes a good deal of sense, longer run. I think we should not only recognize that 1981's recovery will be slow, we should not do anything to offset this, so that we can continue working toward that elusive but necessary balanced budget, now a hopeful target for 1982. We have an opportunity to ensure a bright future for the longer run—provided we consider the long run in setting economic policy. ■

DEUTSCHE ZUSAMMENFASSUNG

Der vorstehende Artikel gibt eine wertvolle Hilfestellung fuer das Verstaendnis der gegenwaertigen und zu erwartenden wirtschaftlichen Ablaeufe in den USA. Er befasst sich eingehend mit dem wirtschaftspolitischen Instrumentarium, das zur Loesung der wirtschaftlichen Schwierigkeiten der Industrienationen einzusetzen ist und stellt einige der zu erwartenden Entwicklungen dar. Der Verfasser warnt in seiner Analyse speziell fuer die amerikanischen Verhaeltnisse vor dem Versuch einer kurzfristig wirksamen Antirezessionspolitik, die vielleicht fuer 1981 einigen Erfolg zeitigen koennte, der laengerfristigen wirtschaftlichen Entwicklung aber keineswegs dienen wuerde. Der Verfasser, der sich mit den Gegebenheiten im amerikanischen Markt eingehend auseinandersetzt, warnt vor allen Hoffnungen auf einen ploetzlichen Wirtschaftsaufschwung. Die massgebliche Rolle der Steuergesetzgebung stellt er in den Mittelpunkt seiner Eroerterung von Inflation, Arbeitsmarktlage und Konsumbereitschaft des US—Buergers. Geringere Steuersaetze bringen ein hoeheres verfuegbares Einkommen mit sich und wirken stimulierend auf den Verbraucher. Jedoch muss die Steuergesetzgebung trotz des tatsaechlichen Wunsches nach schnellem Erfolg bei alledem ausgewogen bleiben. Die unterschiedlichen Auswirkungen von Aufhebung und Reduzierung einzelner Steuern und deren Folgen muessen beachtet werden. Darueber hinaus befasst sich dieser Aufsatz mit der gesamtwirtschaftlichen Entwicklung der USA in den einzelnen Quartalen von 1979 und 1980 sowie der Interdependenz von Inflationsraten und Zinsentwicklung im amerikanischen Markt. Haeufig wird die Kredit-und Wirtschaftspolitik der US-Regierung, insbesondere vom Ausland her, unrichtig eingeschaetzt. Damit werden falsche Schluesse gezogen, die wiederum zu Fehlreaktionen im Markt fuehren.

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Growing Role of Consumer Credit in Germany

by Dr. Helmut Geiger
President,
Federation of
German Savings Banks

Consumer credit, the business of extending credit to people gainfully engaged in all areas of economic and social life, represents one of the most interesting and, particulary in recent years, most competitive segments of the large credit volume. In Germany there is hardly a bank, be it commercial or savings bank or credit union, that does not offer consumer credits.

At the end of 1979, the total monetary assets of Germany's private households, including securities valued at the prevailing prices, totaled DM 1,365 billion. By contrast, the obligations arising out of consumer credits amounted to DM 115 billion. Half of this volume has only been created since 1975. Loans to private households by credit institutes have expanded five times in volume since the end of 1968.

At the close of 1979 Germany's per capita volume of outstanding consumer loans totaled about DM 1,880 or 15.2% of private consumption. These numbers are all the more significant when compared to neighboring countries where comparable values range between DM 540 or 3.0% (Switzerland), DM 1,020 or 8% (Belgium) and DM 1,225 or 13% (Austria). However, in contrast to the U.S. experience, the difference was and still is great: In 1964 it was DM 120: DM 1,100; at the end of 1979 each American averaged an installment credit indebtedness of DM 2,440 or 20.6% of total private expenditures.

Yet, the actual indebtedness of private households in Germany is many times higher than reflected in the figures cited. Not included in this accounting are the loans and credits granted by savings and commercial banks and home building and loan associations for construction of new housing units as well as for the modernization and renovation of old dwellings. The official statistics also do not show retail credits, a method of financing which, however, has no real significance nowadays.

"Loans to private households by credit institutes have expanded five times in volume since the end of 1968."

Borrow and save

In recent years there has been a significant change in the attitude of private households toward borrowing. In keeping with the motto "don't spend what you don't have", many households were formerly very reluctant to take out a loan; today, however, a majority of the population looks on the use of credit as a normal and certainly not as an

unacceptable practice. To be sure, most Germans still tend to save before they spend. Nevertheless, almost a third of the population prefers to use credits in order to meet its goals faster. Saving or repaying periodically are in no ways mutually exclusive for the enlightened bill payer. Federal measures promoting savings and the formation of assets made more people save more resolutely toward their savings goals than in the past and resort to purchase on credit to fill additional needs. Many private households have consciously adopted the obligation to pay a monthly installment as a certain monetary discipline. Thus, without interrupting savings, certain parts of current income can be devoted to improvements of living conditions. It is therefore not unusual to finance major purchases even though the buyer may have a considerable volume of savings and/or securities available.

Small credit losses

German private households have proved to be credit worthy. Even though more households now become involved with consumer credit, they continue to discharge their credit obligations with a high degree of responsibility. The German experience shows that consumer credit losses represent merely up to one percent of the total credit volume. According to reports of savings banks, that percentage also applies to such periods, like 1973/74, when job stability is threatened. The economic uncertainty experienced then did not lead to a greater demand for consumer credits in order to maintain living standards. On the contrary, borrowers were intent on repaying their obligations assumed for financing household projects faster than required and, if possible, to save additionally for an economic reserve. Nor should it be forgotten that credit institutes in areas of industrial concentration with particularly high unemployment and with relatively many workers on shortened work days sought to avoid the impact of deprivation. To lessen the financial burden for households subject to reduced incomes as a result of unemployment or short work days, ways were found in cooperation with the borrowers either to stop payments temporarily, to reduce the installment frequency and/or to extend the original term of the loan.

“Many private households have consciously adopted the obligation to pay a monthly installment as a certain monetary discipline.”

Many borrowers are young

Saving banks have noted that then as now many segments of the population borrow with the aim of acquiring assets. On the other hand, the number of people interested in installment credits for conspicuous consumption or financing vacations continues to be small. They tend to employ current income, short-term savings or overdrafts for such purposes. The financing requirements of the 18-39 year olds are particularly high. The need for consumer credits lessens with advancing age. The purchase of basics concludes the first furnishing phase and thereafter savings are likely to become available for acquisitions. The readiness or likelihood of assuming credits grows to a certain extent with the rise in income. Affluent private households cover their credit requirements largely through credit institutes. On the other hand, blue and white collar workers with below average or median income also resort to installment buying in department stores. In addition, this group of consumers sometimes uses the services of credit agents who impose credit terms that are many times higher.

Savings banks as market leaders

The fact that more and more people are prepared to enter credit arrangements also represents a success of credit marketing. Initially, German wage and salary earners, intent on purchasing vital necessities, were largely dependent on the co-responsibility of the seller. In addition to installment loans provided strictly for specific purposes, cash credit, dominant today, became increasingly popular in the Fifties. A decisive change occurred in the late Sixties through unilateral credit extension, including, at first, the overdraft privilege, then the availability of credit lines repaid on an installment basis. These changes were initiated by savings banks. The overdraft privilege permits private households to overdraw their salary, wage or pension accounts in the amount of one to three monthly incomes. The ready availability of credit in conjunction with modern transfer methods, particularly like Eurochecks, is becoming increasingly popular. Since these procedures are handled without any complication and even provide for automatic repayment out of the account stocked regularly by salary, wage or pension payments, broad segments of the population do not seem to regard overdraft privileges as a real credit. At the end of 1979 German credit facilities had altogether DM 15 billion in overdrafts in force; at the end of 1968 it had been a mere DM 1.3 billion.

“The overdraft privilege permits private households to overdraw their salary, wage or pension accounts in the amount of one to three monthly incomes.”

The repeated accomplishments of savings banks in pioneering consumer credit opportunities has strengthened the market position of these institutions. They account for every second DM of overdraft. Savings banks have in addition a 37% share of the German consumer credit market as against just 31% at the end of 1975. Credits are also extended by credit unions (24%), large commercial banks (14%) and regional banks (11%). The credit institutes specializing in installment financing, which held a strong position in the German credit business during the Fifties, now participate to the extent of only 12%.

Outlook

Further growth of business in consumer credits is anticipated. As households change in respect to income, size and social position, a significant redisposition in the structure of private consumer expenditures is to be expected. Expenses for food, clothes and household requisites will be relatively smaller while expenses for living facilities, automobiles, education and leisure will increase. ■

DEUTSCHE ZUSAMMENFASSUNG

Der Aufsatz behandelt das heutige Konsumentenkreditgeschaeft im deutschen Markt und dessen Entwicklung im Laufe der letzten Jahre. Das Konsumentenkreditgeschaeft ist quer durch alle Bevoelkerungsschichten noch immer in starkem Wachstum begriffen; es hat sich seit 1968 verfuenffacht. Die Bundesrepublik Deutschland lag 1979 mit einem Konsumentenkreditvolumen von DM 1.880, —pro Kopf zwar mit an der Spitze der westeuropaeischen Staaten, aber noch weit hinter den USA. Die genannte Summe entspricht ueber 15% des privaten Konsums. Sie enthaelt noch nicht die Darlehen fuer den Wohnungsbau bzw. Einzelhandelskredite.

Um schneller ans Ziel ihrer Wuensche zu gelangen, nimmt heute schon ein Drittel der Bevoelkerung Kredite in Anspruch.

Trotz der steigenden Zahl von Kreditnehmern bewegen sich die Kreditausfaelle unter der 1%—Schwelle. Daran hat nicht einmal die wirtschaftlich schwierige Situation in den Jahren 1973/74 etwas geaendert. Im Gegenteil, damals gingen die Bestrebungen sogar dahin, aufgenommene Kredite beschleunigt zurueckzuzahlen.

Das Hauptkontingent der Kreditnehmer stellen junge Leute zwischen 18—39 Jahren, die sich in der "Ersteinrichtungsphase" befinden. Gering ist die Neigung, Kredite zu konsumptiven Zwecken und Urlaubsreisen aufzunehmen. Diese werden primaer aus dem laufenden Einkommen, aus Ersparnissen und Dispositionskrediten beglichen. Bei der Kreditaufnahme wird vielmehr ein realer Gegenwert angestrebt. Festzustellen ist, dass die Bereitschaft und Moeglichkeit zur Kreditaufnahme bis zu einem gewissen Einkommen ansteigende Tendenz zeigt. Bei gehobenen Einkommensschichten wird der kreditbedarf ueber ein Kreditinstitut gedeckt. Personen mit unterdurchschnittlichen und mittleren Einkommen sind dagegen eher geneigt, die Ratenkaufangebote in Warenhaeusern anzunehmem oder bei Kreditvermittlern Geld aufzunehmen. Auf dem Gebiet des Konsumentenkredits haben gerade die Sparkassen Pionierarbeit geleistet. Sie sind heute in diesem Zweig des Bankgeschaeftes fuehrend mit einem Anteil von 37% an einem wachsenden Markt.

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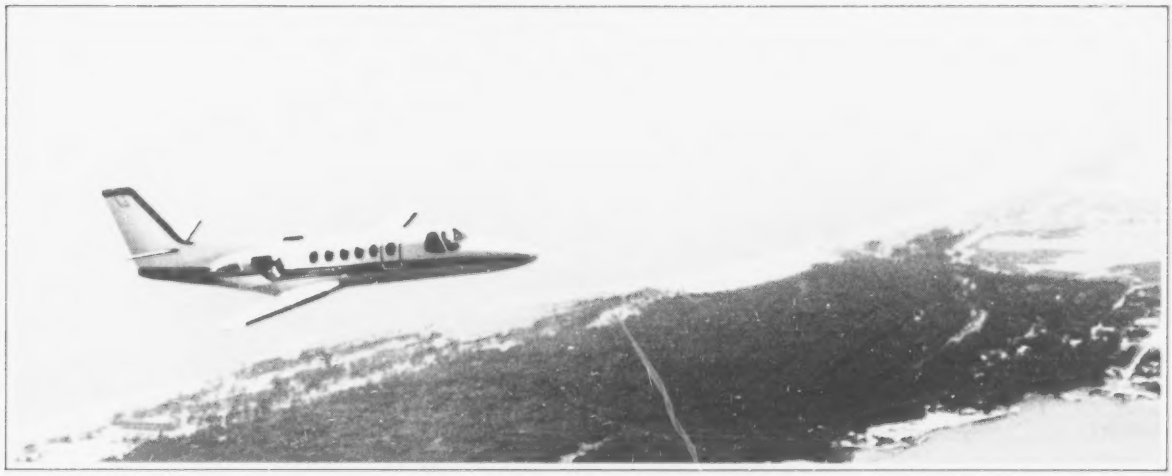

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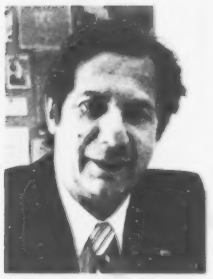
Government Regulation of Business in the United States: Threats and Opportunities



by Dr. Murray L. Weidenbaum
Director, Center for the Study of American Business, Washington University

The rapid and pervasive expansion of government regulation in the United States—a trend which is likely to continue through the decade of the 1980s—is providing business managers with a new set of threats to guard against as well as opportunities to plan for. In the process, virtually every company in the country will become regulated. Most traditional functions of the business firm will face a series of adjustments in their traditional approaches.

Contrary to much popular thinking, the phenomenon of government regulation is not peaking in the United States. On the contrary, major expansions are in the pipeline of impending rulings and prohibitions. Moreover, although the regulatory actions impose higher costs on the firm and limit the discretion of managers, in some ways the rise of government intervention provides new markets and the opportunity to bolster competitive positions in existing markets.

The relations between government and business in the United States are undergoing a fundamental metamorphosis in the wake of the unusual growth of regulatory activity. Each of the standard business functions currently has one or more counterparts in a government agency that controls or at least influences its daily conduct. There is virtually a "shadow" organization chart of public officials matching the structure of each private enterprise.

When we examine the totality of the changes now occurring in business-government relations it becomes clear that they constitute more than incremental growth; in effect they comprise a second "managerial revolution." The first managerial revolution was described originally by Adolph Berle and Gardner Means who wrote in the 1930s. They referred to the separation of the nominal ownership of the larger company from the day-to-day management. The second managerial revolution is shifting much of the decision-making power in the private corporation from the full-time managers chosen by the

"Contrary to much popular thinking, the phenomenon of governmental regulation is not peaking in the United States."

board of directors to the numerous regulators who review and often determine the most important corporate moves.

The critical question in examining the present distribution of government and business authority is not the traditional concern over the formal ownership of the assets (means of production) of the business firm, but rather who makes the main enterpreneurial and operational decisions: What kinds of business should be started? Which goods and services should be produced? Under what arrangements should they be made? Who is to supply the funds? What rates of return should be aimed at? How much of the profits can be kept? Government officials at many levels are now participating in answering these questions which are so basic to the private enterprise system.

So many of these basic decisions, such as the trade-off between quality and price and the choice among technologies, often are no longer made by business managers and subject only to the impersonal ratification by buyers and sellers in the market. Increasingly, the direction of business activity is determined by government officials and thus subject to being altered, postponed, or even disapproved by far more cumbersome and more subjective mechanisms of the political process, notably by self-appointed interest group leaders and by unelected civil servants.

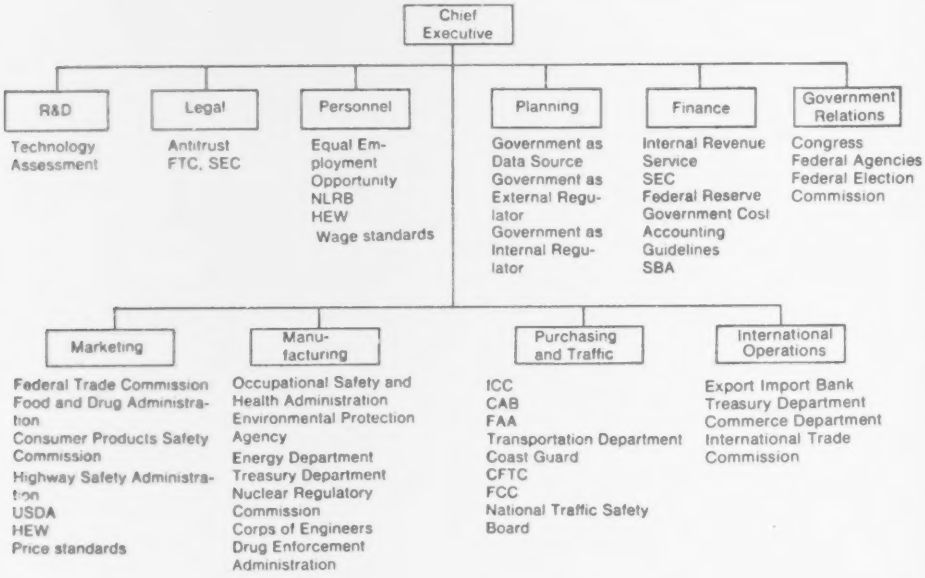
"The expansion of government authority is seen to be a process without any inherent limit."

The business reaction

These changes in public policy in turn lead to a variety of business responses. In practice, most firms utilize a combination of three approaches, varying their responses with the specific external environment in which the company operates, the strengths and weaknesses of its management, and the type of markets it serves. Nevertheless, one overriding fact is becoming painfully obvious: most of the adjustment that business makes to accommodate government intervention either increases the overhead costs of operation or reduces the resources available to carry on the traditional business functions geared to meeting consumer needs.

Passive reactions. At the outset, business executives tend merely to react passively to the imposition of government regulation. They may try to delay the rulings through administrative and court appeals. But usually (and reluctantly) they go along with the new government rules. The expansion of

Typical Industrial Corporation and Federal Government Relations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Planning
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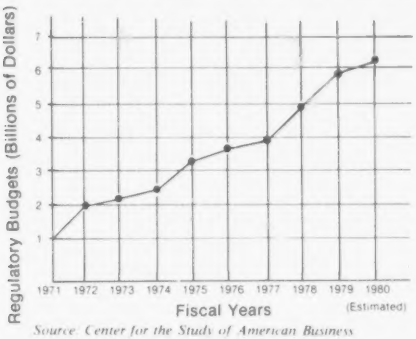
A Decade of Federal Regulatory Growth



Source: Center for the Study of American Business

Expenditures on Federal Regulatory Activities

(Fiscal Years, Millions of Dollars)

Area of Regulation	1970	1978	1980
Consumer Safety and Health	$392	$2,255	$2,467
Job Safety and Other Working Conditions	62	496	701
Environment and Energy	85	1,296	1,866
Finance and Banking	106	273	373
Industry-Specific Regulation	125	297	357
General Business	96	245	277
	$866	$4,862	$6,041

Source: Center for the Study of American Business

government authority is seen to be a process without any inherent limit. That conclusion, however, frequently provides the incentive for the management to turn to one of the more active approaches in dealing with public policy.

Anticipatory reactions. Corporate managements increasingly rely on their planning capability to estimate in advance likely changes in controls over business. Some firms voluntarily take socially responsible actions to make the initiation of more government controls less likely. The typical American corporation is becoming increasingly responsive to the non-economic demands of society. That is not due to any eleemosynary impulse, but arises from a more economic and durable incentive: the desire to protect the company from "demands" by outside groups and ultimately to do well by meeting more fully the aspirations and expectations of the larger society. Many major corporations have gone to great lengths to spell out the rules governing acceptable business conduct, thus reducing the likelihood of another round of government intervention.

Some managers view regulatory requirements as business opportunities. Examples range from marketers of measuring instruments needed in connection with

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monitoring allowable levels of discharge into the environment, to producers of safety devices meeting OSHA standards. An extensive array of research and consulting services also has developed to aid management in complying with government directives, such as filing required environmental impact statements or in preparing briefs contesting specific enforcement actions. Detailed understanding of the government's changing regulatory requirements and procedures can provide a new type of competitive edge in business.

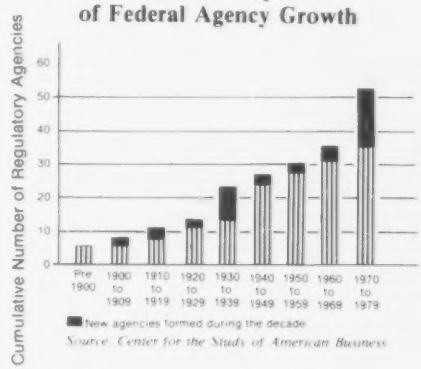
Active reactions. The third category of business strategies comprises attempts to influence the character of government intervention. This means exercising a more positive role in the development and enactment of public policy. Many companies are expanding their public relations departments to cover the entire gamut of public and government affairs and are enhancing the ability of their Washington offices to deal more effectively with pending legislation and new regulation—or they are establishing such organizations if they do not exist.

Because corporate managers find their managerial prerogatives increasingly curtailed by government, senior executives are overcoming their traditional reluctance to get involved in the give-and-take of public policy disputes. A type of chief executive quite different from the traditional figure is emerging.

It is in the active approach—business involvement in the public arena—where the greatest potential for improving business-government relations may lie. Perhaps the most fundamental response to the widespread public dissatisfaction with the business system is simple, but not so readily accomplished. It is for each company to do a better job of "minding the store"—concentrating on producing products at lower costs and developing new and better goods and services for the public. Satisfied customers constitute the strongest bulwark of the private enterprise system.

To a significant degree, a balanced and sensible response by business to public pressures may indeed provide a limit to the further proliferation of government regulation of private economic activity. But the ultimate barrier to the further expansion of government power over the private sector can only be more widespread citizen awareness of the close relationship between personal and economic liberties. The capitalistic nations by and large are also the free nations. That correspondence between those countries with economic freedom and those with personal freedom is not coincidental. Those societies that have a large and independent profit-making private sector have avoided the concentration of power that results in a totalitarian state. Boiled down to its essence, economic freedom is inseparable from political freedom. ■

Historical Perspective of Federal Agency Growth



Source: Center for the Study of American Business

Expenditures on Federal Regulatory Activities

(Fiscal Years, Millions of Dollars)

Area of Regulation	*1970*	*1971*	*1972*	*1973*	*1974*	*1975*	*1976*	*1977*	*1978*	*1979*	*(Estimated) 1980*	*1981*	*% Change 1970 to 1979*	*% of 1981 Budget*
Social Regulation														
Consumer Safety and Health	$ 392	$ 593	$ 948	$1059	$1251	$1347	$1464	$1772	$2261	$2474	$2606	$2857	+531%	41%
Job Safety and Other Working Conditions	62	104	124	227	310	379	447	492	544	642	742	800	+935%	12%
Environment and Energy	85	146	493	585	759	967	1026	1047	1296	1517	1688	2217	+1685%	32%
Total Social Regulation	539	843	1565	1871	2320	2693	2937	3311	4101	4633	5036	5874	+760%	85%
Economic Regulation														
Finance and Banking	106	123	134	142	158	186	211	240	273	296	294	352	+179%	5%
Industry-Specific Regulation	125	151	166	140	203	220	251	286	297	318	377	384	+154%	5%
General Business	96	105	120	133	153	169	199	225	245	271	316	327	+182%	5%
Total Economic Regulation	327	379	420	415	514	575	661	751	815	885	987	1063	+171%	15%
Grand Total	$ 866	$1222	$1985	$2286	$2834	$3268	$3598	$4062	$4916	$5518	$6023	$6937	+537%	100%
Annual Nominal Increase		41%	62%	15%	24%	15%	10%	13%	21%	12%	9%	15%		
Annual GNP Deflator		5.1%	4.1%	5.8%	9.7%	9.6%	5.3%	5.5%	7.3%	8.9%	8.9%	8.8%		
GNP Deflator Index[1]	100	105.1	109.4	115.7	127.0	139.2	146.5	154.6	165.9	180.7	196.7	214.0		
Total in 1970 $	$ 866	$1163	$1814	$1976	$2231	$2348	$2456	$2627	$2963	$3054	$3062	$3242		
Annual Real % Increase		34%	56%	9%	13%	5%	5%	7%	13%	3%	0%	6%		

NOTE [1]GNP Deflator figures for years 1971-1977 are taken from *Statistical Abstract of the United States, 1978*. Figures for 1978-1981 are taken from the *Budget of the United States Government, Fiscal Year 1981*.

Source: Center for the Study of American Business

DEUTSCHE ZUSAMMENFASSUNG

Der Autor vertritt die Ansicht, dass sich die Fuehrungsverantwortlichkeiten im amerikanischen Wirtschaftswesen derzeit zum zweiten Mal in diesem Jahrhundert verlagern. Gingen die Verantwortlichkeiten in den dreissiger Jahren von Firmeninhabern auf bezahlte Manager ueber, so gehen sie jetzt fuer bestimmte Teilbereiche von den Managern auf die Verwaltung ueber.

Das Verhaeltnis zwischen Wirtschaft und Verwaltung ist in den USA in einem starken Wandel begriffen. Die staerker werdenden Reglementierungen des Wirtschaftslebens in den USA und die damit einhergehenden Beschraenkungen und Auflagen bringen fuer das freie Unternehmertum Bedrohungen, aber auch Chancen mit sich. Jede Firma ist von zunehmenden gesetzlichen Regelungen betroffen. Durch diese Beschraenkungen werden aber auch neue Maerkte und Wirtschaftszweige geschaffen und die Wettbewerbsfaehigkeit auf den bestehenden Maerkten verbessert. Durch die zunehmenden behoerdlichen Regelungen finden immer mehr Geschaeftsfunktionen der Industrie ihr Gegenstueck in Verwaltung und Regierung. Immer mehr Entscheidungen der Wirtschaftsunternehmen werden aber auch von der Regierung mitgetragen. Heutzutage stellt sich die Frage, wer ueberhaupt die wesentlichen Wirtschaftsentscheidungen trifft.

Dies fuehrt zu Verhaltensaenderungen bei den Firmenleitungen. Dabei sind im wesentlichen drei verschiedene Arten von Reaktionen festzustellen. Auf der einen Seite die passiven Antworten; man versucht z.B. das Inkrafttreten der neuen gesetzlichen Bestimmungen hinauszuzoegern. Eine weitere Folge ist das Vorausschauen und das fruehzeitige Sicheinstellen auf die zu erwartenden gesetzlichen Aenderungen, um damit spaeteren Problemen aus dem Weg zu gehen. Die dritte Art, auf die Gesetzesflut zu reagieren, ist die aktive Einflussnahme auf die Gesetzgebung, z.B. erweitern viele Firmen die Abteilungen fuer Oeffentlichkeitsarbeit und richten entsprechende Bueros in Washington ein.

Durch Gesetze, die in die Fuehrungsrechte der Firmerleitungen eingreifen, wird der Typ des Managers und der Firmenorganisation immer mehr veraendert. Es ist deshalb darauf zu achten, dass der gesetzliche Einfluss auf das Wirtschaftsleben nicht ueberhand nimmt und das freie Unternehmertum seiner Initiative beraubt.

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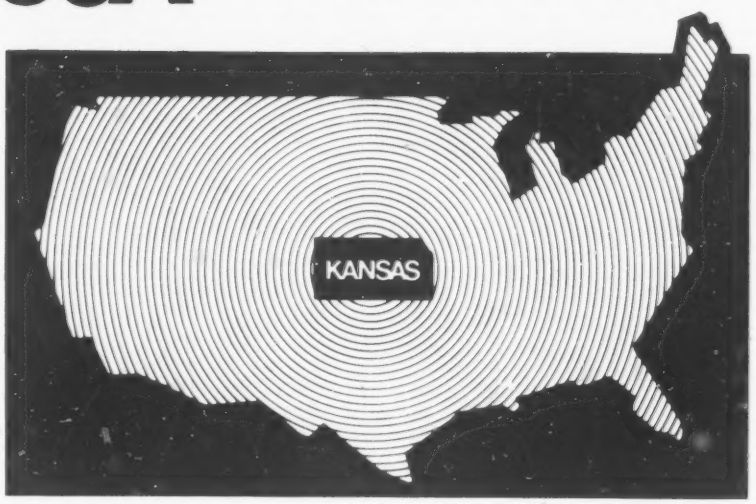

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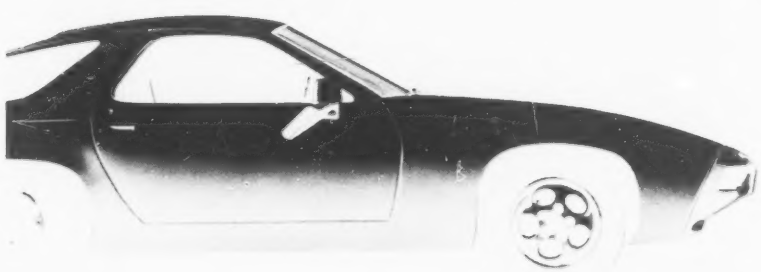

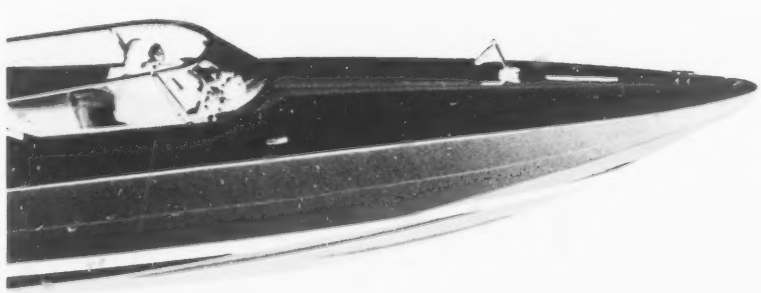

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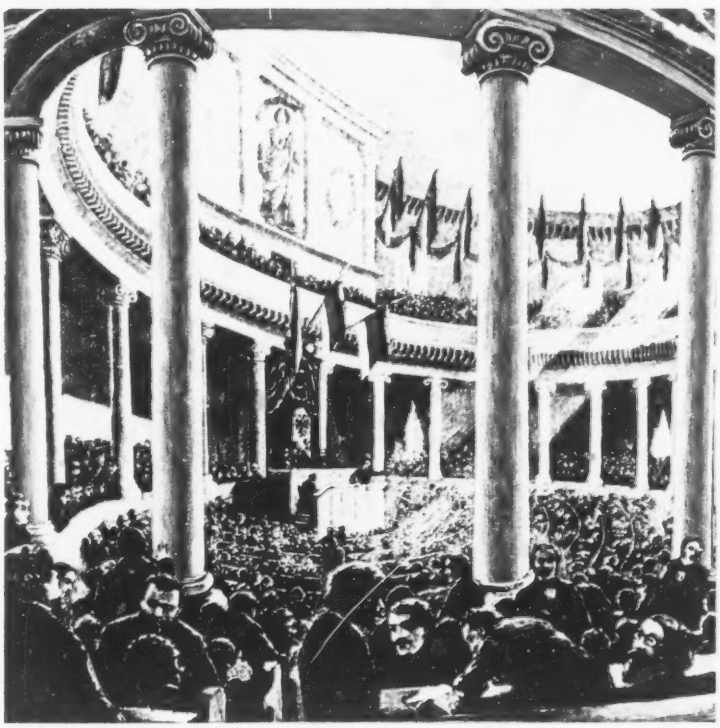

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Improving U.S. Productivity Growth

by Conran Dyche
National Association of Manufacturers

Productivity and productivity measurement are extremely complex economic and statistical concepts. Yet, productivity increase is probably the most important American economic goal of the next decade. The benefits to be realized from increased productivity include increased real per capita income, increased real output, deceleration in the inflation rate, increased competitiveness of American goods in the world markets, and in general increased satisfaction and enhanced "quality of life" for Americans. The apparent slowdown in American productivity growth has been cause for a great deal of national concern especially in the face of rapidly accelerating inflation, decreased or static growth in real wages, and a deteriorating trade position. It seems imperative that we do something to improve productivity growth. In order to suggest means for improving productivity growth, it is necessary to define productivity and to list major factors influencing productivity growth. Ways of improving growth can then be summarized.

Productivity growth is usually defined as the ratio of output to the number of hours of labor input. This measure of productivity does not tell us anything about the specific contribution of the labor input to productivity, but rather this measure is influenced by a whole host of other factors such as technology, capacity utilization, and the like. Given changes in technology and factor prices, it is possible that labor inputs would be substituted for other inputs, with the effect of reducing labor productivity as it is measured. The economy would be responding in an efficient manner to changes in underlying economic conditions, but some people would point to decreased labor productivity as evidence of inefficient economic performance. An alternative measure of productivity would be output per unit of total input. Techniques for calculating such a measure have been worked out by various economists. This type of measure might be more apporpriate when examining sources of productivity growth. The United States as a nation should attempt

"Productivity growth is usually defined as the ratio of output to the number of hours of labor input."

to produce the same output with fewer inputs or greater output with the same inputs provided that the costs of increasing productivity do not outweigh the benefits.

Table I
OUTPUT PRODUCED PER HOUR OF LABOR INPUT
ANNUAL % CHANGE

	PRIVATE NONFARM BUSINESS	MANUFACTURING
1967	1.9	.3
1968	3.2	3.6
1969	-.2	1.3
1970	.2	-.1
1971	3.0	5.2
1972	3.6	4.8
1973	1.7	2.8
1974	-3.1	-5.0
1975	2.0	5.1
1976	3.5	4.4
1977	1.5	3.0
1978	.5	.5
1979	-1.1	-.9
1950-1979	2.1	2.5
1960-1979	1.9	2.5
1970-1979	1.3	2.3

SOURCE: *U.S. DEPARTMENT OF LABOR*, MONTHLY LABOR REVIEW, *BUREAU OF LABOR STATISTICS*.

TABLE II
INTERNATIONAL COMPARISON OF PRODUCTIVITY AND UNIT LABOR COSTS IN MANUFACTURING (AVERAGE ANNUAL RATES OF CHANGE)

	OUTPUT PER HOUR			UNIT LABOR COSTS		
COUNTRY	1973-79	1977-78	1978-79	1973-79	1977-78	1978-79
U.S.	2.2	.5	1.5	7.0	7.7	7.6
CANADA	2.8	4.7	.8	9.0	2.4	8.7
JAPAN	4.2	7.9	8.3	6.8	-2.6	-1.6
FRANCE	5.1	4.9	5.4	9.9	7.3	7.7
GERMANY	5.0	3.4	5.2	4.3	4.0	1.2
ITALY	3.3	3.0	8.7	17.0	11.2	10.9
U.K.	.6	1.2	2.2	17.8	14.3	12.3

SOURCE: *U.S. DEPARTMENT OF LABOR, INTERNATIONAL COMPARISONS OF MANUFACTURING PRODUCTIVITY AND LABOR COSTS.*

In any case, all measures of productivity seem to indicate that productivity growth in the United States has declined and in some instances turned negative. (see Table I). Furthermore, international productivity statistics would seem to indicate that U.S. productivity growth has lagged behind productivity growth in other industrialized nations (see Table II).

External influences

The primary factors which influence productivity growth include economies of scale, allocation of scarce resources, technological innovation, and government regulation. These factors are all related and are influenced by other factors which include the state of the economy, profitability of investment, taxes, anti-trust laws, and industrial organization and management. Most growth accounting studies maintain that technological innovation is the most important source of productivity growth, and that decreased technological innovation is responsible, in substantial part, for the recent deceleration in productivity growth.

Expenditure on research and development (R&D) is generally believed to be a key factor in the formation and development of new technology. Expenditure on R&D as a percentage of gross national product in the United States has declined from 2.97% in 1964 to 2.22% in 1979. This relative decline is primarily the result of decreased government expenditure on R&D. The government's share of R&D expenditure has declined from over 60% in the 1960's to just over 50% while R&D funding has declined as a percentage of the federal budget. Increased government expenditure on R&D would seem to be a desirable goal, as would tax incentives for private R&D expenditures. Tax credits for R&D expenditures as well as faster depreciation of structures and equipment for R&D use would seem to be useful proposals. It is vital that the United States maintain an adequate pool of new technology, especially for long-term productivity growth.

Perhaps more important than actual technology growth is the diffusion of technological know-how into the productive process. This diffusion is accomplished in large part through new capital formation and investment. The faster the rate of new capital formation and investment, the faster will be the application of new technology embodied in the new capital stock. Thus, policies designed to increase investment in the private sector are of large importance. Tax proposals designed to increase returns to investment are particularly popular. These proposals include faster depreciation of plant and equipment, reduction in corporation income taxes, elimination of double taxation of corporate dividends, reductions in the capital gains tax, and

"Perhaps more important than actual technology growth is the diffusion of technological know-how into the productive process."

increases in investment tax credits. These proposals seem to be highly desirable. According to the Analyses of Tax Impact Model devised by the Norman B. Ture, Inc., adoption of the familiar 10-5-3 depreciation scheme would increase investment by $29.9 million, $119.9 million in 1985, and $78.6 million in 1990. Tax incentives designed to increase personal savings would also be desirable.

imposition of government wage and price controls of "standards" (a good bet in times of volatile inflation) further contribute to the uncertainty and risk associated with investment. It seems unrealistic to expect tax incentives to have a significant positive impact on investment if the economy is experiencing runaway, uncontrollable, and volatile inflation. Considering these facts, it would seem that a credible government

"It seems unrealistic to expect tax incentives to have a significant positive impact on investment if the economy is experiencing runaway, uncontrollable, and volatile inflation."

While these tax proposals and tax reform are important tools in the attempt to improve productivity growth, they are part of a larger picture. The state of the economy and inflation in particular are key factors affecting investment. Volatile inflation increases uncertainty about future conditions and discourages investment and capital formation. Long-term investment projects are particularly affected by economic uncertainty. Furthermore, policy using responsible monetary and fiscal policy designed to reduce inflation is desirable. This might require sacrificing short-run productivity growth for long-run productivity growth, but it is hard to imagine any specific proposal that would serve to increase productivity significantly in the face of runaway inflation.

Government regulation has had a negative impact on investment, capital formation, and productivity growth. Edward Denison

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has estimated that government regulation concerning requirements to protect the environment against pollution and regulation protecting worker health and safety reduced output per unit of input by 1.4% in 1975 from what it would have been given 1967 business conditons. Because of this regulation, significant portions of new capital have been needed to address environmental and safety considerations, and have not been used to produce more goods and services. While government regulation designed to improve the environment and worker safety is a worthwhile endeavor, the costs in terms of productivity growth should not exceed the benefits derived from this legislation. This regulation has contributed to delays in the implementation and completion of business investment projects. Thorough and ongoing examination of these regulations is needed to insure that their costs do not outweigh their benefits. Another important point to make is that increased productivity will give us increased resources with which to deal with environmental and safety problems.

A second major factor in productivity growth is allocation of resources. For example, the movement of workers out of the agricultural sector into jobs with higher marginal productivity was a significant source of productivity growth in the 1950's and 1960's. Allocation of resources to their best use is crucial to increased productivity growth. Two of the many factors which impede efficient resource allocation are inflation and government regulation.

> ***"Inefficient allocation of resources among alternative uses reduces productivity growth."***

The inflation dampener

Volatile inflation has a significant negative impact on efficient resource allocation. The major function of the price system is to convey information about the relative costs of various alternative combinations of inputs. In times of inflation, this information becomes garbled. Market agents do not have reliable information with which to allocate resources to their best use. Governmental wage and price controls further hamper the price mechanism from working. An inflationary economy is an inherently inefficient economy. Inefficient allocation of resources among alternative uses reduces productivity growth. Again,

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goverament policies designed to reduce inflation are of critical importance in encouraging long-run productivity growth.

Governmental regulation and taxation have significant negative impact on the efficient allocation of resources. Government imposed paperwork and the cost of interpreting and then complying with countless government regulations diverts resources away from production. Often, the best managerial talent in American corporations is used to interpret and deal with government regulation instead of production. Tax regulations tend to discriminate between different types of business activity and encourage investment in some areas while discouraging investment in others. Regulations concerning new criteria for hiring inhibit efficient allocation of manpower. Coherent government regulation that is easy to comply with is of vital importance to improving productivity growth. Again, the costs of governmental activity must be compared to the benefits of that activity. However, it would seem that reduction in governmental activity where there is a market alternative would serve to significantly improve resource allocation and productivity growth. Specifically, government attempts to impose wage and price controls and rationing schemes should be discouraged.

"Government imposed paperwork and the cost of interpreting and then complying with countless government regulations diverts resources away from production."

Attempts by the government to prop up "sunset" industries also can have the effect of encouraging inefficient allocation of resources. Industries that are clearly in decline because of structural economic change should not be subsidized by the government. Instead, resources should be allowed to move into "growth" industries where these resources can be better utilized. This, of course, requires freedom of resource movement. The definition of a declining industry is a complex matter. If it is apparent that an industry is declining in large part because of excessive government regulation, then that regulation should be lifted in order to determine if the industry is viable. However, industries that are declining and are not experiencing excessive government regulation should not be subsidized.

Economies of scale are important factors

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in increasing productivity growth. Increased economic growth and activity will increase economies of scale and productivity. Predictable coherent government monetary and fiscal policy would help provide a stable economic environment conducive to rapid economic growth.

A principal benefit that could be derived from increased productivity growth would be increased competitiveness of American exports. Although many other factors including domestic monetary and fiscal policy, exchange rates, comparative advantage, tax policies, and export policies help determine our trade position, it is realistic to expect that increased productivity would result in cheaper goods for export. This would depend upon the extent to which reduction in unit costs are translated into price reductions. Productivity growth might help the American trade balance in manufactured goods. Improvement in our trade balance in manufactured goods would be one way to offset part of the oil deficit. Improvement of our competitive position is clearly preferable to currency depreciation as a means of improving the American trade position.

In summary, there are many useful policy alternatives that would probably improve productivity growth. Government regulation is an important factor in technological innovation and efficient operation of our economy. However, a stable and predictable general economic environment is probably the most important ingredient for improved investment and productivity growth. ■

“A principal benefit that could be derived from increased productivity growth would be increased competitiveness of American exports.”

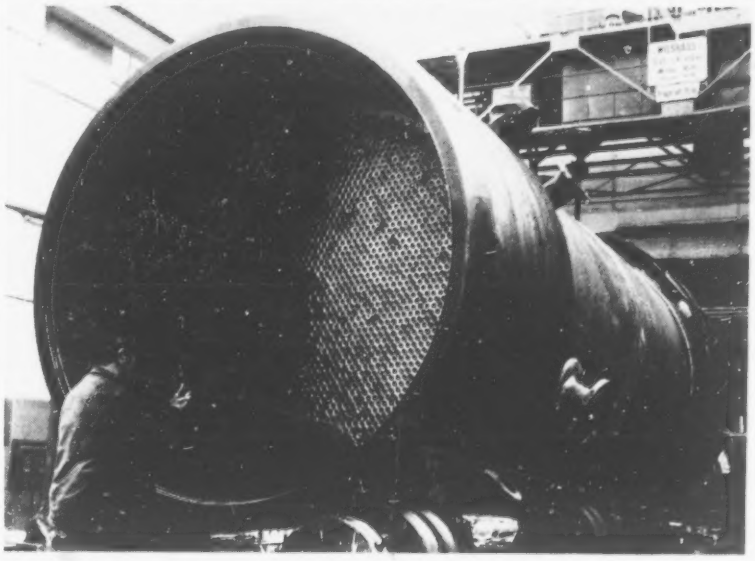
DEUTSCHE ZUSAMMENFASSUNG

Der Aufsatz befasst sich mit dem Produktivitaetszuwachs in den USA sowie der Moeglichkeit, diesen zu beeinflussen und zu messen. Die Zunahme der Produktivitaet muss das wichtigste Ziel der USA auf wirtschaftlichem Gebiet fuer das naechste Jahrzehnt sein, denn sie bedeutet gleichzeitig hoehere Pro-Kopf-Einkommen, bessere Wettbewerbschancen und damit auch einen hoeheren Lebensstandard fuer die Bevoelkerung.

Gerade waehrend der momentanen Stagnation der Produktivitaetskurve wird dies offensichtlich. Die Feinheiten und Einzelheiten der Messung von Produktivitaet erlaeutert der Autor im einzelnen. Auch wenn es verschiedene Arten der Messung von Produktivitaet gibt, so ist allgemein festzustellen, dass heute die Zunahme langsamer vor sich geht bzw. auf gewissen Gebieten sogar ein negativer Trend zu verzeichnen ist. Dabei schneiden die USA noch schlechter als manche andere Laender ab. Ein Schluesselfaktor zur Produktivitaetsmessung ist das Mass der technischen Neuerungen, denn daran laesst sich ablesen, was in den naechsten Jahren an industriellen Hilfsmitteln auf den Markt kommen wird, und vor allen Dingen, welche — vom Verfasser naeher erlaeuterten — wirtschaftspolitischen und wirtschaftlichen Entwicklungen dies mit sich bringt.

So brachten zum Beispiel die neuen Umweltschutzgesetze eine Abschwaechung des Produktivitaetszuwachses mit sich. Weitere Einflussfaktoren sind die geografische Naehe der Industriebetriebe zu Rohstoffen, Arbeitnehmern etc. Auch gesetzliche Regelungen haben massgebliche Einfluesse auf das Wachstum der Produktivitaet. Breiten Raum widmet der Autor den Moeglichkeiten zur Stimulierung eines Produktivitaetswachstums. Besonders Hilfen bei der Umsetzung von Forschungsergebnissen in Produktionsverfahren von privater und staatlicher Seite (ueber Steuerregelungen) spielen hier eine bedeutsame Rolle. Am wichtigsten ist aber, auch in USA, fuer hoehere Investitionen und ein weiteres Produktivitaetswachstum ein stabiler und berechenbarer gesamtwirtschaftlicher Rahmen.

Vital Dimensions in Metals



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This was how Wilhelm Merton, founder of Metallgesellschaft in Frankfurt, described the style of his Company. A spirit of enterprise, stability, watchful observation of the market and shrewd planning provided even at that date the impetus for the launching of Metallgesellschaft as a worldwide organization for international trading in metals and ores. Today the Frankfurt Company, with its research, mining, smelting, processing, engineering and plant contracting, as well as transport operations, is one of the leading trading concerns in the world.

In the world of today, a good show is no longer performed discreetly, behind the scenes. This also holds good for the trading activities of Metallgesellschaft, in the context of which the London Metal Exchange plays an important part. Backed by tradition, experience and a considerable financial potential, the experts of Metallgesellschaft are active there on behalf of the firms of their own Group and of international customers. Their work is based on trust, which has been steadily built up and maintained by the Company ever since the days of its founder.

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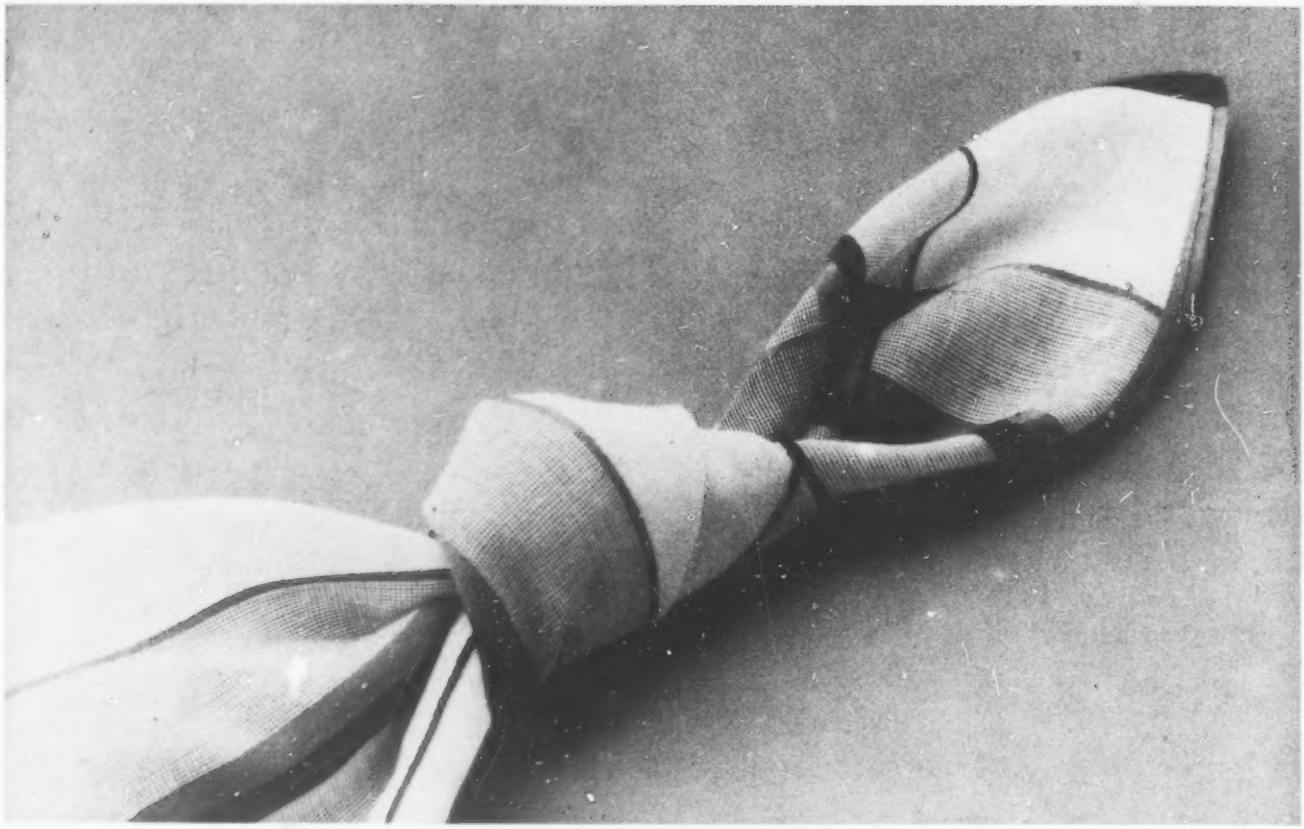

Cologne Trade Fairs '81
Hang on to success

* German **Furniture Fair**	**January 21.–25.**
* **ISM** – International Sweets and Biscuits Fair	**February 2.–6.**
* **DOMOTECHNICA** – International Fair for Household Appliances, Fittings and Components	**February 11.–14.**
* **International Housewares Fair**	**February 12.–15.**
* **International Hardware Fair** Tools, Locks + Fittings, D-I-Y Supplies	**February 14.–17.**
* **International Men's Fashion Week** Cologne together with **International Jeans Fair** Cologne	**February 22.–24.**
* International trade fair **CHILDREN and YOUNG PEOPLE** Cologne	**March 13.–15.**
* **INLAND WATERWAYS 81** – International Inland Waterways and Ports Developement Exhibition	**March 15.–19.**
* **West-German Fine Arts and Antiques Fair** Cologne – Dusseldorf	**March 21.–29.**
* **COLOUR 81** – International Exhibition for Painting Technic, Colour Application and International Painters' and Decorators' Convention	**March 26.–29.**
* **INTERZUM** – International Fair for Accessories, Equipment, Materials for Furniture Production, Interior Work and Furnishing-Machines for the Upholstery Industry	**May 22.–26.**
* **International Men's Fashion Week** Cologne together with **International Jeans Fair** Cologne	**August 28.–30.**
* **SPOGA** – International Trade Fair of Sport Goods, Camping Equipment and Garden Furniture	**September 12.–15.**
* International **Garden Trade Fair**	**September 13.–15.**
* International trade fair **CHILDREN and YOUNG PEOPLE** Cologne	**September 25.–27.**
* **6th European Microfilm Congress 1981** International Seminars and Exhibition - EMK	**29. Sept. – 2. Oct.**
* **ANUGA** – World Food Market **consuma** – International Trade Sector for Foods and Nonfoods **gastroma** – International Sector for the hotel, restaurant and fast food industry and the food service/catering market **technica** – International Technical Sector for the Grocery Trade, Retail Grocery Industry and Food Industry	**October 10.–15.**
* **s + b** – 7th International Trade Fair for Sports, Swimming Pool and Leisure Facilities	**October 28.–31.**
International Art Fair Cologne	**November**
* **Cologne AV Convention** – Audiovisual Media in Practice	**November**

Subject to alteration

* Admission restricted to trade visitors.

KölnMesse

Information:
Hans J. Teetz, German American Chamber of Commerce, Inc., 666 Fifth Ave., New York, N.Y. 10103.
Tel. 212/974-8836/8837/8830, Telex 023/234209

1981 Fair Dates to Remember

JANUARY	14-18	**FRANKFURT**	Home Furnishing Textiles, Floor Coverings and Household Textiles
	15-18	**DUESSELDORF**	Trade Fair for Silverware
	21-25	**COLOGNE**	German Furniture Fair
	22-25	**FRANKFURT**	IMA International Amusement and Vending Machines Trade Fair
	23-Feb. 1	**BERLIN**	International Green Week
	24-Feb. 1	**DUESSELDORF**	Boot '81 12th International Boat Show
FEBRUARY	2-6	**COLOGNE**	ISM International Sweets and Biscuits Fair
	5-11	**NUREMBERG**	International Toy Fair
	7-11	**FRANKFURT**	Music Fair Frankfurt International Trade Fair, Musical Instruments, Musical Accessories, Music Publishers
	11-14	**COLOGNE**	DOMOTECHNICA, International Fair for Large Household Apparatus and Electrical Appliances
	12-15	**COLOGNE**	International Housewares Show
	14-17	**COLOGNE**	International Hardware Show
	14-17	**MUNICH**	INHORGENTA Jewelry, Watches & Clocks
	21-24	**OFFENBACH**	International Leather Goods Fair
	21-25	**FRANKFURT**	International Frankfurt Spring Fair
	22-24	**COLOGNE**	International Men's Fashion Week
	23-26	**DUESSELDORF**	VAT Subcontractors Trade Fair
	26-March 1	**MUNICH**	ISPO International Sports Equipment Fair
	28-March 6	**BERLIN**	ITB, International Tourism Exchange
MARCH	1-3	**MUNICH**	International Fashion Week
	8-11	**DUESSELDORF**	IGEDO International Fashion Fair
	13-15	**COLOGNE**	International Fair CHILDREN and YOUNG PEOPLE
	14-22	**MUNICH**	33rd International Light Handicrafts Fair
	15-19	**COLOGNE**	Inland Waterways 81 International Inland Waterways and Ports Development Exhibition
	17-22	**FRANKFURT**	ISH, International Trade Fair Sanitation-Heating-Air Conditioning
	21-23	**DUESSELDORF**	GDS, International Show Fair
	21-29	**COLOGNE**	Fine Arts and Antiques Fair
	26-29	**COLOGNE**	Colour 81
APRIL	1-8	**HANOVER**	Hanover Fair
	4-9	**DUESSELDORF**	Euroshop Fitting-Advertising-Selling
	5-8	**BERLIN**	Interchic Fashion Fair
	8-12	**FRANKFURT**	International Frankfurt Fur Fair
	26-29	**DUESSELDORF**	IGEDO, International Fashion Fair
MAY	5-8	**FRANKFURT**	INTERSTOFF, Clothing Textiles Fair
	14-20	**DUESSELDORF**	Interpack International Trade Fair for Packaging Machinery, Packaging Materials and Confectionery Machinery
	19-22	**MUNICH**	Interhospital Hospital Supply Show
	22-26	**COLOGNE**	Interzum, International Fair for Accessories, Equipment, and Materials for Furniture Production, Interior Work, and Furnishings—Machines for the Upholstery Industry
	27-June 2	**HANOVER**	LIGNA International Woodworking Machinery and Supplies Fair

MÜNCHEN

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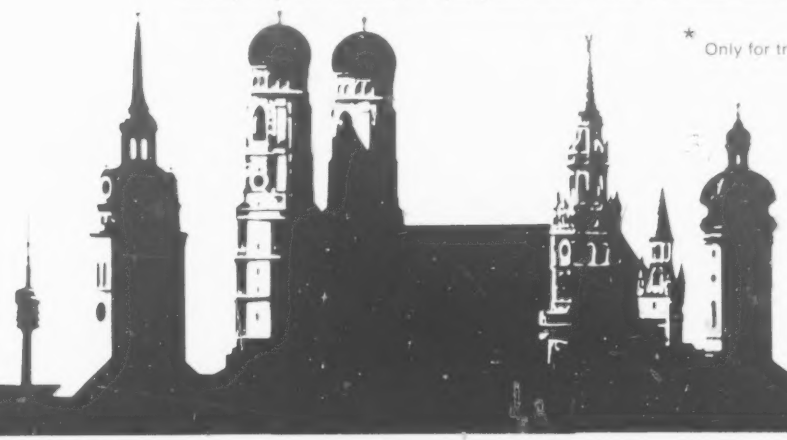
DATES 1981

7 - 15 February	CARAVAN — BOOT — INTERNATIONALER REISEMARKT 12th International Exhibition for Caravans, Boats, Travel and Vacation	
14 - 17 February	INHORGENTA — 8th International Trade Fair for Watches, Clocks, Jewellery, Precious Stones and Silverware with their Manufacturing Equipment	*
26 February - 1 March	ISPO — Spring — 14th International Sports Equipment Fair	*
14 - 22 March	IHM — 33rd International Light Industries and Handicrafts Fair The Fair for small and medium-sized Enterprises	
29 - March - 1 April	43rd MODE-WOCHE-MÜNCHEN — International Fashion Fair	*
22 - 25 April	98th Congress of the German Surgical Society with Information Show	
8 - 10 May	COSMETICS 2nd International Trade Fair for Cosmetics, Health and Beauty Care	*
19 - 22 May	INTERHOSPITAL International Hospital Exhibition and 11th German Hospital Meeting	
1 - 4 June	LASER OPTO-ELEKTRONIK — 5th International Congress and Trade Fair	
23 - 27 June	IFAT — 6th International Trade Fair for Waste Treatment and Disposal Sewage — Refuse — City Cleaning — Winter Service	
10 - 13 September	ISPO — Autumn — 15th International Sports Equipment Fair	*
17 - 20 September	INTERMONTEC — Equipment for Alpine Sports, Leisure Activities and Tourism — 6th International Trade Exhibition with Conferences	
23 - 28 September	IGAFA — 11th International Trade Fair of Hotel and Catering Trades	*
4 - 7 October	44th MODE-WOCHE-MÜNCHEN — International Fashion Fair	*
19 - 23 October	SYSTEMS — Computer Systems and their Application International Congress and Trade Fair	
10 - 14 November	PRODUCTRONICA — 4th International Trade Fair for Manufacture in Electronics with Demonstrations and Conferences	
21 - 29 November	HEIM + HANDWERK — Handicrafts in the Domestic Sphere with Special Shows and Technical Displays by the different Handicrafts Branches	

INFORMATION

Munchener Messe- und Ausstellungsgesellschaft mbH, Messegelände, P.O.B. 12 10 09, D-8000 München 12, Federal Republic of Germany, Telephone (089) 51 07-1, Telex 5 212 086 ameg d

US-representative: Gerald G. Kallman Associates, 30 Journal Square, Jersey City, N.J. 07306, Tel. (201) 653 3304, Telex: 710-5380 Goodword jcty.



* Only for trade buyers

1981 Fair Dates to Remember

JUNE	1-4	**MUNICH**	Laster Opto-Electronics Congress and Show
	11-17	**DUESSELDORF**	International Mining Exhibition
	18-24	**DUESSELDORF**	REHA International Congress with Exhibition Aids for the Disabled
AUGUST	4-13	**BERLIN**	International Radio and Television Exhibition
	28-30	**COLOGNE**	International Men's Fashion Week
	29-Sept. 2	**FRANKFURT**	International Frankfurt Fall Fair
SEPTEMBER	10-13	**MUNICH**	ISPO International Sports Equipment Fair
	12-15	**COLOGNE**	SPOGA, International Sporting Goods Fair
	13-15	**COLOGNE**	International Garden Supply Fair
	13-16	**DUESSELDORF**	IGEDO, International Fashion Fair
	15-24	**HANOVER**	EMO European Machine Tool Exhibition
	17-27	**FRANKFURT**	IAA, International Motor Show
	19-Oct. 23	**MUNICH**	SYSTEMS Computer System and Application
	23-27	**BERLIN**	Overseas Import Fair, "Partners for Progress"
	23-28	**MUNICH**	IGAFA Hotel and Restaurant Show
	25-27	**COLOGNE**	International Fair CHILDREN and Young People
	26-28	**DUESSELDORF**	GDS, European Footwear Samples Show
	29-Oct. 2	**COLOGNE**	6th European Microfilm Congress
OCTOBER	10-15	**COLOGNE**	ANUGA, World Food Market
	11-14	**BERLIN**	Interchic Fashion Fair
	14-19	**FRANKFURT**	Book Fair
	17-25	**HAMBURG**	German International Boat Show
	19-23	**MUNICH**	Systems Computer Show
	25-28	**DUESSELDORF**	IGEDO International Fashion Fair
	28-31	**COLOGNE**	International Exhibition of Sports Facilities and Swimming Pools
NOVEMBER	3-6	**FRANKFURT**	INTERSTOFF, Clothing Textiles Fair
	3-6	**FRANKFURT**	FAB, Office Equipment Exhibition
	18-21	**DUESSELDORF**	MEDICA, International Congress and Exposition
		COLOGNE	International Art Fair Cologne
		COLOGNE	Cologne AV Convention Audiovisual in Practice
DECEMBER	1-4	**DUESSELDORF**	A+A, Industrial Safety+Factory Hygiene—Congress and Trade Fair

For further information, admission tickets, room reservation forms and preliminary list of exhibitors contact:

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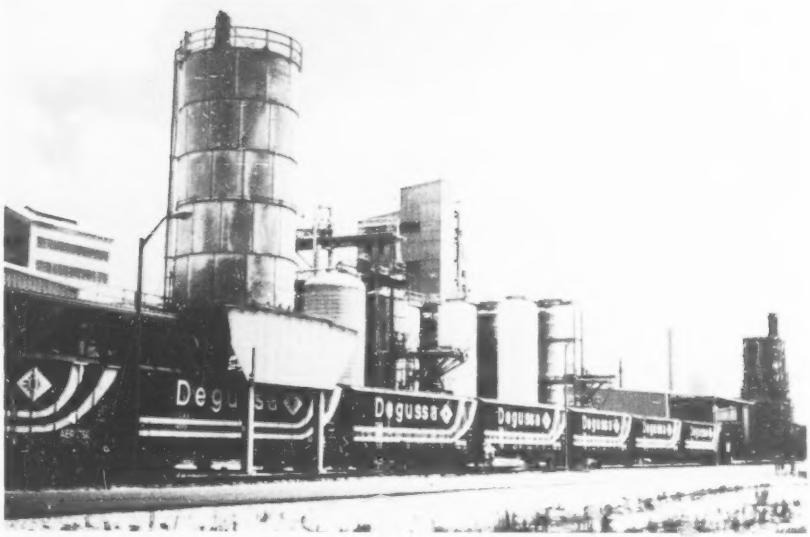
Representative Office, One Farragut Square South, Washington DC 20006, Tel.: (202) 347-0247
Suite 2701 Peach Tree Center, Harris Tower, 233 Peach Tree St., N.E., Atlanta, GA 30303, Tel.: (404) 577-7228



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ABD SECURITIES CORPORATION is a U.S. investment banking firm owned by Banque Bruxelles Lambert S.A. (Brussels), Bayerische Hypotheken-und Wechsel-Bank (Munich) and Dresdner Bank Aktiengesellschaft (Frankfurt/Main). The firm was incorporated in 1968 and adopted its present name in 1972. ABD employs about 70 professionals and staff employees in all areas of the investment banking business. Headquarters are in New York with branches in Boston, Chicago, Los Angeles and San Francisco.

As one of the leading U.S. investment banks owned by non-U.S. interests, ABD provides it clients and its parent banks and their clients with a wide range of financial services.

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AEG-TELEFUNKEN

The AEG-TELEFUNKEN GROUP works in a widespread field of electrical engineering and electronics. In many sectors the Group, which from the outset was internationally oriented, has performed decisive pioneering work.

The orders received by the Group in the business year 1979 exceeded DM 14.300 billion. The world sales reached approx. DM 14.200 billion. Of this figure sales in Germany amounted to DM 8.200 billion, and sales abroad to DM 6 billion. If the world-wide sales are divided up by sectors we obtain the following picture:

Power engineering and industrial systems	23%
Telecommunication and transportation systems	19%
Industrial and electronic components	17%
Household appliances	22%
Entertainment electronics	13%
Office machines	6%

The world-wide production and sales organization is the basis of foreign business which comprises exports and the production and sales of foreign subsidiaries: in 1979 this business accounted for 42% of world-wide sales. In 31 countries AEG-Telefunken operate more than 74 production and sales companies in which the Group has the majority of shares, and in a further 39 countries its own sales promotion offices. In 84 other countries the Group is represented by local companies; in some it owns minority shares. Thus, in the scope of global business AEG-Telefunken are represented in 154 countries.

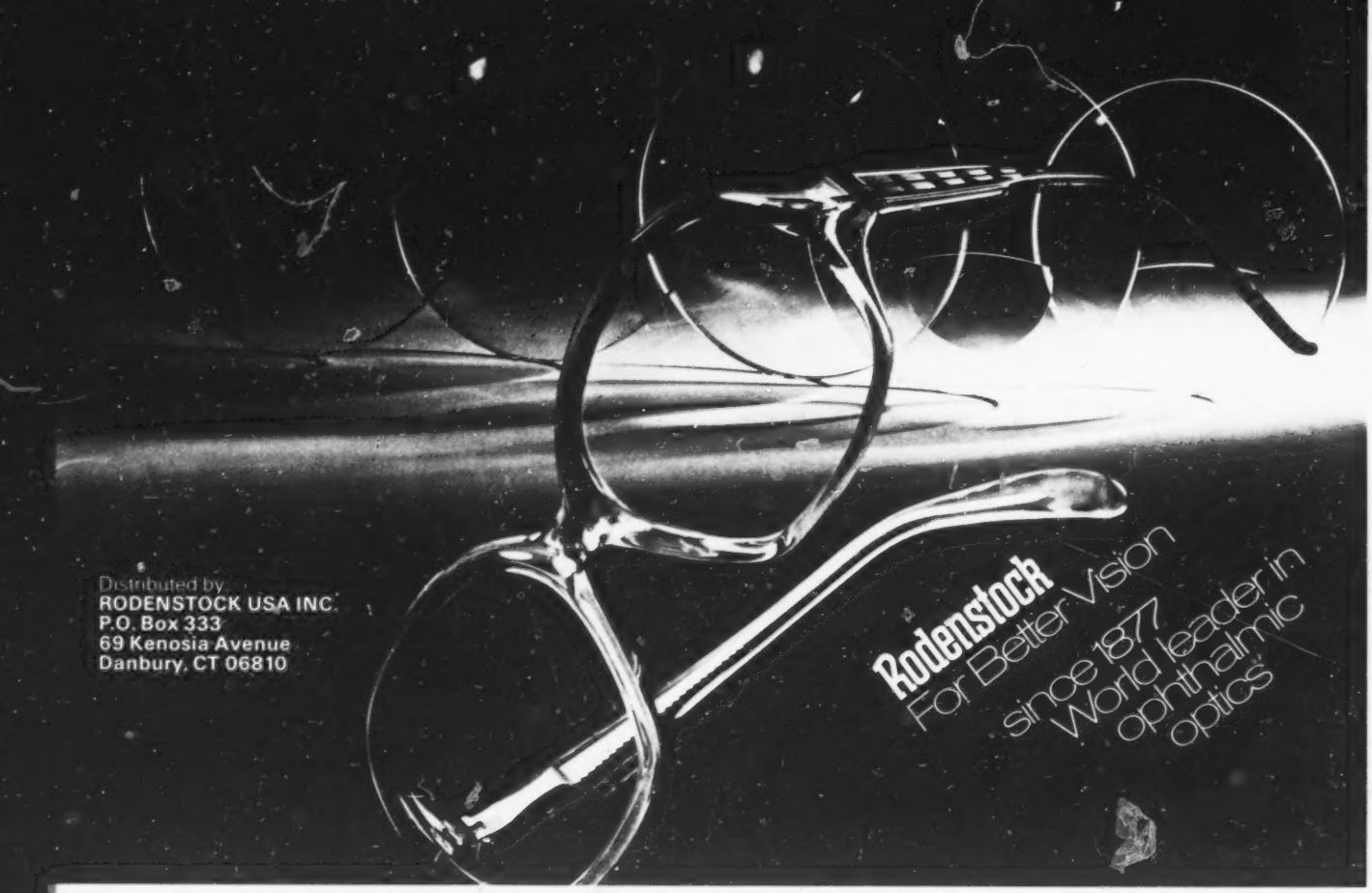
In the consolidation strategy of the AEG-Telefunken Group the high expenditure for research and development plays an important role: this expenditure is an investment for the technical future of the company, particularly in business with capital goods. During the business year 1979 these investments at DM 1 billion (+10%)—equal to 7% of the total world-wide sales—were far higher than investments in fixed assets at DM 430 million and investments in subsidiaries. More than two-thirds of the expenditure for research and development were made for Power Engineering and Industrial Systems as well as for Telecommunications and Transportation Systems. The positive balance of the Group as regards licenses is a reflection of the research and development standard which has been in the top group internationally.

More than 10.000 employees, including more than 4.000 highly qualified scientists and engineers, work in the research institutes in Berlin, Frankfurt and Ulm, in special institutes and in numerous development laboratories.

AMK Berlin

BERLIN, city of international trade fairs and congresses: The trade fairs, exhibitions and congresses held in Berlin are recognized both nationally and internationally as tools of marketing and forums for communication. The events staged by AMK Berlin Company for exhibitions, fairs, and congresses have been instrumental in determining the excellent position enjoyed by Berlin as a venue for fairs, thereby contributing in a major way to the fact that the Federal Republic of Germany is in the front rank among countries of the world with regard to trade fairs. Among the most well-known of the events are the International Tourism-Exchange ITB Berlin, a world leader in this sector, the International Green Week Berlin, an important show demonstrating the capabilities and achievements of the agricultural and food industries, the International Radio and TV Exhibition and the Overseas Import Fair, "Partners for Progress". The comprehensive range offered in the program and the AMK Berlin Exhibition Grounds under the Funkturm, the Radio Tower, well-established over the years, attracted a total of 1.7 million visitors from 104 countries in 1979.

The construction of the International Congress Center Berlin, with its immediate proximity to the Exhibition Grounds, is proof of a development that has been recognized in Berlin and has already been put into effect. To an increasing extent exhibitions and fairs are being held in conjuction with congresses, specialist



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conferences, advanced training seminars and symposia, thereby offering an opportunity during a trade fair or exhibition to combine theory with practice, to intensify technical knowledge and to exchange experiences and new findings. The ICC Berlin, fully operational with the above-mentioned events accompanying fairs since April 1979, together with international scientific symposia, with entertainment such as concerts, theater presentations and shows has provided proof of its capabilities and at the same time it has taken a step forward in the further development of the field of trade fairs and exhibitions.

Allianz

ALLIANZ INSURANCE COMPANY (AIC), with headquarters in Los Angeles, California, is an affiliate of Allianz Versicherungs-AG of Munich—the largest insurance group in Europe. With an overall direct premium volume of more than $5.8 billion, the Allianz family ranks among the ten largest in the world. Its California-based affiliate provides full underwriting facilities in North America, and especially for German-linked transatlantic risks.

AIC, along with its other U.S.-based Property/Casualty affiliates, is a growing concern, with assets of almost $160 million. The group offers a broad range of commercial insurance coverages which span all principal lines of business, including general liability, workers compensation, commercial auto, property, inland and ocean marine, and technical coverages in the areas of boiler and machinery, and builders' risk.

The U.S.-based facilities are further complemented by a direct AIC subsidiary, Allianz Underwriters, Inc., which is active in the excess and surplus lines marketplace, and by Allianz Intermediaries Surplus Line Brokers, Inc. which has facilities for wholesale brokerage placements throughout the U.S. and London markets. Allianz Underwriters, Inc., and Allianz Intermediaries are also headquartered in Los Angeles.

Allianz Syndicate, Inc., and Allianz Management Co. constitute additional Property/Casualty facilities which operate through the newly-established New York Insurance Exchange, and they serve to round out an increasingly formidable Allianz presence in the U.S. Property/Casualty marketplace.

All U.S.-based Property/Casualty operations are under the common leadership of Mr. Frank E. Raab, a thirty-four year veteran of the American Property/Casualty industry. Mr. Raab is President and Chief Executive Officer of AIC, and is Chairman of the Board of Directors, as well, of each concern.

As noted, a central emphasis for Allianz's American venture is to service the transatlantic needs of German-linked risks, and particularly the existing clientele of Alliance Versicherungs-AG. For this purpose a separate unit has been established within the Home Office of AIC, staffed with highly qualified professionals who have strong contacts and credentials in this field. Mr. Herbert Hansmeyer, an AIC Vice President, is responsible for heading up this German-link Department.

"Allianz"has been a byword for pioneering innovation in the Property/Casualty marketplace—particularly in commercial lines such as engineering (Technical) insurance. An independent scientific foundation supported by Allianz conducts internationally acclaimed research in the loss prevention field, particularly with regard to industrial and automobile risks.

Allianz's entry into the U.S. has included the 1979 acquisition of two sizable life insurance companies—Fidelity Union Life Insurance Company of Dallas, Texas, and North American Life & Casualty Company of Minneapolis, Minnesota.

This broad-based debut into the U.S. insurance marketplace is part of a program of worldwide diversification and growth which has included the establishment of affiliates in Brazil, Egypt, Saudi Arabia, Indonesia, Venezuela and Australia as well.

AMERICAN HOECHST CORPORATION moved into the billionaire class in 1979 when sales reached $1.174 billion, a 27 percent increase over 1978 sales.

In the 26 years since it started business in the USA, with sales of $1 million in 1953, American Hoechst's growth has averaged 45 percent per year.

Net profits in 1979 rose 36 percent, reaching $30 million compared to $22 million in 1978.

The company plans to double sales to $2 billion by 1985, investing about $800 million between 1980 and 1985, not counting acquisitions.

American Hoechst's strategy is to grow faster than the average growth rate of the U.S. chemical industry, fueled with intensive capital investments, with technology and know-how of the parent firm, Hoechst AG, and with research.

An integral part of the American Hoechst growth plan is the heavy emphasis on research and development. In 1979, the company invested $41 million for research, a 24 percent increase over 1978's $33 million. About half the research investment was for pharmaceuticals.

For new plants and equipment, American Hoechst invested $189 million in 1979, an increase of 80 percent over 1978's $105 million. A large part went into the construction of two production facilities near Houston, Texas. One, a 900-million-pound capacity styrene monomer plant, started operating in mid-1980. The other, a 220-million-pound capacity high density polyethylene plant, has started production in September, 1980.

Another large investment in 1979 was for the acquisition of the polyester film business and plant from Celanese Corporation.

Several of the company's larger divisions achieved significant sales increases in 1980: Petrochemicals division sales were up 54 percent; Plastics division up 37 percent, Fibers division up 30 percent; Film division up 56 percent; Industrial Chemicals division up 12 percent; Azoplate division up 15 percent; and Hoechst-Roussel Pharmaceuticals, Inc., a subsidiary, up 12 percent.

Atlantic Capital Corporation

ATLANTIC CAPITAL CORPORATION, originally established in 1970, is a U.S. investment banking firm, wholly owned by Deutsche Bank AG. Atlantic Capital employs about 70 professionals and staff employees.

The corporate finance activities of Atlantic Capital include: The management of debt and equity public security offerings in the U.S. and international markets; the private placement of debt securities with U.S. and non-U.S. institutional investors; advising European companies in making acquisitions of U.S. companies; specialized corporate financings, such as tax-exempt Industrial Revenue Bonds and Pollution Control Bonds to finance plant and equipment in the U.S.; lease and currency hedge financing and financial advisory services, especially in connection with corporate acquisitions in the United States.

In the last five years Atlantic Capital has managed or co-managed well over 100 different transactions including U.S. private placements, public offerings, Industrial Revenue Bond offerings, Pollution Control financings, lease financings and Euro-bond financings. In addition, the firm served as a financial

advisor to numerous European companies which made acquisitions of U.S. public and privately owned corporations.

The underwriting activities of Atlantic Capital consist of participations in most domestic and international syndicates, formed for the distribution of securities. In the past 12 months Atlantic Capital participated in over 200 public offerings, underwriting a total of approximately 200 million dollars. These commitments were placed with financial institutions around the world.

The Stock Trading Department makes a market and trades as principal in foreign securities and has an important agency order execution capability in American securities. In addition, the firm is a registered third market maker in over 125 U.S. stocks. The firm is a member of most regional exchanges.

The Bond Trading Department makes active markets in U.S. domestic debt securities with special emphasis on "Yankee Bonds" and "Eurobonds," dealing with a broad range of institutional investors, who are serviced by a special bond sales group.

The firm's Money Management services cater to private and institutional clients desiring to have their assets managed and supervised in New York on a discretionary basis.

ACL

ATLANTIC CONTAINER LINE is an international company formed by six major European shipping companies to provide a developing through-transport service between Europe and North America.

In 1965 Atlantic Container Line was formed by three Swedish Companies—Wallenius (the world's largest sea carrier of motor cars), the Swedish American Line and the Transatlantic Steamship Company Limited—and the Holland America Line of Rotterdam. These companies were later joined by the French Compagnie Generale Transatlantique (CGT) and the British Cunard Steamship Company. Late in 1974 the Brostrom Group of Sweden acquired the transport division of Holland America Line. Their ACL share is now owned and managed by Intercontinental Transport (ICT) BV, Dutch subsidiary of the Brostrom Group. A further development occurred in 1976 when the three vessels of Care Line—owned by CGT, SAL and Wallenius—became fully integrated into the ACL fleet.

The six companies of the group are: Compagnie Generale Maritime (CGM) (France); The Cunard Steamship Company Limited (United Kingdom); Intercontinental Transport (ICT) BV (Netherlands); Swedish American Line (Sweden); The Transatlantic Steamship Company Limited (Sweden); and Walleniusrederierna (Sweden). Atlantic Container Line was formed initially to enable these companies to meet together the high capital investment involved in building, operating and developing a fleet of roll-on/roll-off containerships on the North Atlantic.

The Group owed much of its initial impetus to the Wallenius company which had conceived the idea of building a fleet of large and fast roll-on/roll-off cargo and car carriers for transatlantic service. When Atlantic Container Line was formed, a technical committee with representatives from all participating companies was organized to deal with the construction of ACL vessels.

While containerization would form an important part of the Atlantic Container Line service, it was recognized from the start that shippers would need cargo handling and carrying capacity for goods that could not be containerized, or for goods that could be handled better and less expensively by not being containerized. The company's purpose in developing a combined roll-on/roll-off container fleet was to provide a fast, efficient and economically attractive general cargo service that includes motor cars.

ACL first introduced Ro/Ro to the U.S.-North Atlantic trade in 1967. It currently operates ten fast modern Ro/Ro container ships direct from the U.S. east coast to eight major ports in the United Kingdom, France, the Netherlands, Belgium, West Germany and Scandinavia. With rapid load and unload capabilities, ACL's vessels offer eight to twelve hour turn-around and three-times-a-week sailings from U.S. ports.

BfG Bank für Gemeinwirtschaft

Established in 1958 with headquarters in Frankfurt, BANK FUER GEMEINWIRTSCHAFT (BfG) operates as a commercial bank, offering its customers a complete range of 'universal' banking services. With consolidated assets of DM 54.6 billion at the end of 1979, the BfG Group ranks among the ten largest German banks. It has a staff of 7,300 and maintains a domestic network of over 250 offices throughout the Federal Republic of Germany and West Berlin. Its affiliated companies include Allgemeine Hypothekenbank AG, BSV Bank fuer Sparanlagen und Vermoegensbildung AG and WTB Westdeutsche Kreditbank GmbH.

In recent years, BfG has also expanded its international banking activities, supported by its subsidiary BfG Luxembourg, branches in London, New York and Cayman Islands as well as associated banks in Amsterdam, Basel and Tel Aviv. The BfG is also represented in Sao Paulo and Hong Kong.

BfG's shareholders are German trade unions which hold 99.4 percent of its capital through Beteiligungsgesellschaft fuer Gemeinwirtschaft, a holding company with major interests in Volksfuersorge Lebensversicherung AG, West Germany's second largest insurance company, Neue Heimat Staedtebau GmbH; Co-Op Zentrale AG, and several other important companies.

BHF-BANK

BERLINER HANDELS- UND FRANKFURTER BANK

While the story of BHF-BANK dates back to the middle of the last century, its present status results from a merger between Berliner Handels-Gesellschaft and Frankfurter Bank. As a limited Company (KGaA), the Bank is owned by shareholders and is directed by its personally liable Managing Partners. It is a commercial bank and issuing house, is involved in portfolio management and securities business, and has been active in international finance for more than one hundred years. The Bank thus combines the advantages of a company that has access to the capital market, with all the flexibility of a private bank.

Headquartered in Frankfurt, BHF-Bank serves a broad and diversified clientele: industrial companies (including nine out of ten top German companies), multinational corporations, government agencies, public entities, international organizations, and financial institutions as well as private customers.

Through its own foreign branches, subsidiaries, representative offices and membership in the Inter-Alpha Group of Banks, BHF-Bank is well positioned to provide its clients with individually packaged financing wherever the need arises: in Europe, in North and South America, in the Middle East, in Africa, in Southeast Asia, and in the Far East.

BHF-Bank International, Luxembourg, affords direct access to the Euromarket and, together with BHF-Bank's branches in New York and the Cayman Islands, gives the Group the facilities and flexibility to tap the Euro-currency and Euro-capital markets in both the European and North American time zones.

As a result of its traditional involvement with large companies engaged in foreign trade, BHF-Bank is exceptionally well versed in the nuances of international commercial banking—from routine transactions to the most complex financial packages. The Bank concentrates its creative skills on wholesale banking activities, principally for larger companies. Through the years, its proven ability to tailor its facilities to meet the most stringent requirements of its clients, and its commitment to efficiency and good service have contributed substantially to the successful development of German and international companies, as well as subsidiaries of multinational corporations operating in Germany.

Steady growth and enthusiastic product acceptance mark the history of BMW OF NORTH AMERICA, INC., since it became responsible for importing and marketing Bavarian Motor Works automobiles in March, 1975.

Since then, automobile sales have increased from an annual rate of 15,000 to 34,520 in 1979. The national BMW dealer organization has grown by 33% to 355 and sales-per-dealer now total 90, an increase of 60% from the 1975 rate.

The company's growth continued in 1980 as it assumed responsibility for importing and marketing BMW motorcycles through a nationwide network of 240 dealers. The company also established an emission control laboratory at its Western regional headquarters in Los Angeles.

BMW's 1980 model range—a two-door, four-cylinder sedan, the 320i; two four-door, six-cylinder sedans, the 528i and 733i; and a limited production sports coupe, the 633CSi—is designed to appeal to a specific segment of the driving public. The BMW driver is one who seeks a sporty and exhilarating driving experience and appreciates a machine of high technical quality and functionality.

Fuel economy became a major consideration for BMW's 1980 models, and BMW engineers responded with a model lineup expected to yield a 30% improvement in the company's CAFE rating for the model year.

1980 marks BMW of North America's second year in the American marine market. As part of the company's Allied Products Group, BMW Marine offers 12 engines, including diesel auxiliaries of 7, 12, 35 and 50 horsepower inboard and sterndrive turbo-charged diesel engines of 150 horsepower, and inboard and sterndrive gasoline engines of 130, 190, and 220 horsepower.

The Allied Products Group is also responsible for automobile parts, sales, service, and parts for BMW Marine products; and development and distribution of a line of special automotive-related merchandise and "lifestyle" accessories, under the name, "Ultimates by BMW."

BMW of North America's corporate performance enabled the company to enter the commercial paper market during 1978, issuing notes up to $35 million. BMW's commercial paper offering marks the first time an American subsidiary of a West German company entered this market without the financial guarantee of its parent company.

John A. Cook serves as president of BMW of North America.

BANKAMERICA INTERNATIONAL is a wholly owned Edge Act subsidiary of Bank of America NT&SA with offices in New York, Chicago, Miami, Houston, Seattle, Cleveland, Minneapolis, Dallas and San Francisco. During 1981, additional offices are scheduled to be opened in Boston, St. Louis and Atlanta.

Our New York office was originally opened in 1950 and has been in continuous operation longer than any other Edge Act bank in the United States. In fact, BankAmerica International in New York alone is so large that by itself it would rank as one of America's top 30 banks.

In large part, this growth can be attributed to the experience and expertise of BankAmerica International's personnel, as well as its relationship with more than 1,100 Bank of America branches, subsidiaries, and affiliates around the world.

Thanks to this global network, BankAmerica International serves as a convenient contact point with the rest of the world for domestic customers and as a doorway to the United States for foreign clients.

BankAmerica International offers a complete range of international banking services. Everything from letters of credit and collections to international cash management and foreign exchange. And now Federal regulations allow us to finance the production of exports, as well as international trade.

The New York office is staffed by approximately 950 men and women and is divided into five service sections: A European, Middle East, and African Division; Latin American Division; Asia Division; an International Financial Center consisting of a domestic money market, foreign exchange desk, corporate customer service unit and Nassau branch; and an International Banking Office serving the international banking needs of U.S. based customers.

BANKERS TRUST COMPANY, with headquarters in New York and $29 billion in assets, is the ninth largest bank in the United States and one of the leading international banks in the world. It was founded as a trust company for New York banks in 1903 and became a full commercial bank in its own right in 1917. Today, Bankers Trust Company has branches, subsidiaries, affiliates and representative offices in more than 30 countries.

Bankers Trust provides a full range of wholesale banking and financial services to its customers throughout the world. The Bank's expansion overseas began when it opened offices in Europe more than half a century ago.

Bankers Trust has had a long-standing strategy of increasing its commitment to the German market. Our local presence in Germany began in 1967 when Bankers Trust became a minority shareholder in Deutsche Unionbank GmbH, acquired majority ownership in 1970, increased its ownership to 75 percent in 1975 and purchased the entire share capital in 1979. The final step was taken in early 1980 when the subsidiary was renamed Bankers Trust GmbH.

In Germany, our wholly owned subsidiary, Bankers Trust GmbH, is headquartered in Frankfurt with branches in Dusseldorf, Hamburg and Munich. Bankers Trust Company also maintains a Representative Office in Frankfurt.

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wholesale commercial banking, foreign trade financing, securities and investment, foreign exchange and international money markets, and mergers and acquisitions. It is an important link in Bankers Trust's many activities in the Eurocurrency market.

Bankers Trust GmbH also serves as a regional center for the Middle Europe Division of the International Department and for the North Europe Division of the World Corporate Department.

Bankers Trust's international investment banking services have also expanded significantly. These activities range from managing international bond issues and arranging private placements to providing specialist advice on financing major projects and the trading of securities. In all these areas, Bankers Trust continues to contribute its experience in the German market.

BAVARIA

During the past 25 years the West German state of BAVARIA has developed from an agricultural to a highly modern industrial region. The efficiency of Bavaria's economy is highlighted by the trend of the gross domestic product (GDP): between 1960 and 1979 Bavaria recorded the largest increase in GDP at current prices of all federal states.

The successful co-operation between science, important research centers and research-intensive industries offers location advantages, particularly to companies using advanced technology. A well-developed road network connects Bavaria with the important centers of West Germany and Europe. The energy supply Bavaria offers to its industry ranges from natural gas to nuclear energy. Bavaria offers a well-educated, highly-trained labor force. Industrial investments at favorable land prices can be made without delays. Leisure and recreation promote efficiency.

Bavaria promotes industrial investments in development areas by granting generous, tailor-made financial assistance. The political and economic stability which this West German state has enjoyed for many decades helps to safeguard capital investments. The profound confidence placed in Bavaria's economic and political development is reflected in the high level of foreign investment: DM 4 billion since 1961.

The Industrial Location Advisory Office of the Bavaria Ministry of Economics offers a wide range of valuable services; it helps investors find a suitable site, establishes contact with communities and the competent authorities and supplies detailed information on government financial assistance.

The *Industrial Location Advisory Service* can be contacted at the following address: Bavarian Ministry of Economics, Prinzregentenstrasse 28, D-8000 Muenchen 22, West Germany; Phone 089 2162-642; Telex: 5 23 759 bywvm d

In the United States of America: Information from: Kallman Associates, 30 Journal Square, Jersey City, New Jersey 07306; Phone 201-653-3304.

HYPOBANK

BAYERISCHE HYPOTHEKEN- UND WECHSEL-BANK AKTIENGESELLSCHAFT

BAYERISCHE HYPOTHEKEN- UND WECHSEL-BANK, established in 1835, is one of the Big Five of the private commercial banks in the Federal Republic of Germany. With about 490 branches located mostly in southern Germany and investments in various other banks (for instance Westfaelenbank AG, Westfaelische Hypothekenbank AG and Wuerttembergische Hypothekenbank), Hypo-Bank can arrange any type of commercial or mortgage banking service, including loans for public debts funded by the Bank's own bond issues.

Hypo-Bank's partnership in ABECOR, the largest group of banks world-wide, provides access to the money and foreign exchange markets in 120 countries. In Austria, the bank works through its subsidiary, Salzburger Kredit- und Wechsel-Bank AG. There are branches in New York and London as well as representative offices in Johannesburg, Madrid, Mexico City, Rio de Janeiro, Sao Paulo, Sydney and Tehran. Further, Hypo-Bank holds equity in European Latinamerican Bank, Ltd. (EULA Bank), London, whose main task is to arrange Eurocredits to fund major projects in Central and South America as well as in Europe. The largest foreign subsidiary, providing direct access to Eurocredits and Eurodeposits, is Hypobank International S.A., Luxembourg.

Bayerische Landesbank Girozentrale

Size:
Among the top 5 banks in Germany and the first 25 in the world.
Service Spectrum:
Commercial and investment banking embracing the full gamut of domestic and international financial services.
Central Office:
Munich, West Germany

International Presence:
Luxembourg—wholly-owned subsidiary (Bayernlux)
London and Singapore—full-service branches

Nordic countries—Deutsch-Skandinavische Bank (50% holding)
Johannesburg, New York, Toronto, Vienna—Representative offices

BAYERISCHE LANDESBANK traces its beginnings to the late nineteenth century with the establishment of a state financial institution (Landesbodenkreditanstalt) whose primary function was public sector financing within Bavaria. With the emergence of the Sparkassen another major bank was founded—Bayerische Gemeindebank—which served as central banker and liquidity manager for the regional Sparkassen. In time, Bayerische Gemeindebank developed into a full-fledged commercial bank. These financial institutions were the mainsprings for further expansion into all banking areas after the two institutions merged to form Bayerische Landesbank Girozentrale in 1972.

The founder-owners of Bayerische Landesbank were the State of Bavaria and the regional Sparkassen, which are the sole shareholders and guarantors. As a unit bank, with only one domestic branch in Nuremberg, it is equipped to provide the full range of domestic and international banking services.

The Bank's main activities are structured into six separate banking functions: Commercial Banking, Investment Banking, Issuing Activities, Central Banker to Bavaria and its Municipalities, Central Bank for Bavaria's Sparkassen, Building and Loan Association.

Bayerische Landesbank has also successfully expanded its own worldwide banking facilities, achieving an ever more

important position in global financing for both corporate and public sector clients. The range of international services includes: International payments (SWIFT) and documentary business, trade financing, buyers' credits, foreign exchange services, Eurofinance, syndication of international loans, managing of bond issues, private placements and SD Certificates, securities trading, investment advisory services, dealing in precious metals, etc.

BAYERISCHE VEREINSBANK AKTIENGESELLSCHAFT, incorporated in Munich as a commercial bank in 1869 and merged with Bayerische Staatsbank (founded 1780), today ranks fourth among the largest publicly-owned banks in Germany and 21st among the largest banks in the world. Together with its mortgage subsidiaries, Bayerische Vereinsbank is the largest publicly-owned, long-term banking group in Germany. As of June 30, 1980, the Bank had a staff of 10,342 employees. Its consolidated balance sheet showed total assets of DM 85.5 billion.

As one of the few banks specializing in both the credit and mortgage fields, BV is an especially versatile financing institution. Headquartered in Munich, BV has branches in the German banking capital of Frankfurt as well as in Stuttgart and Berlin. Its corporate business is conducted throughout its 383 branches which are located mainly in southern Germany. Bayerische Vereinsbank also holds interests in several well-known private banks in West Germany.

The expansion and diversification of its international business and branch network has followed the continued growth of Germany's international trading relations. The Bank maintains foreign branches in New York, Chicago, Los Angeles, Grand Cayman and loan production offices in Cleveland and Atlanta (all operating under the name Union Bank of Bavaria). Additional branches are in Tokyo and London. Representative offices are maintained in Paris, Johannesburg, Caracas, Rio de Janeiro, Teheran and Tokyo. BV has enhanced its presence in the United States by establishing First Bavarian Capital Corporation, an investment banking affiliate in New York. Other representative offices have been opened in Manama Bahrain, Hong Kong and Athens.

Bayerische Vereinsbank provides comprehensive banking services to individual and numerous corporate customers, amongst them several American corporations. Corporate loans are made in Deutsche Marks and in principal Eurocurrencies, notably U.S. dollars. International banking services include the financing of German external trade as well as international and local trade and projects in other European countries and overseas. Bayerische Vereinsbank is also engaged in extensive securities and investment banking operations. The mortgage business of the Bank comprises both long term loans to individuals and corporations and loans to or guaranteed by authorities in the Federal Republic of Germany. Both of these types of loans are financed by the Bank through the issuance of bonds in the German capital market.

BECKER OF NORTH AMERICA, INC., a member of the Becker group of companies offering products which enhance communications and safety on land and in the air, was established to sell and service Becker products throughout North America. The company's original function, when established under the name of Becker Electronics, Inc. in 1968, was to provide service for Becker auto radios, factory-installed in the leading makes of German automobiles. Becker Electronics, Inc. changed its name when its operations were expanded to include the import and distribution of Becker auto radios and Becker avionics equipment produced by Becker Autoradiowerk GmbH, Karlsbad, Germany and Becker Flugfunkwerk GmbH, Baden-Oos, Germany, respectively.

The companies are named after Max Egon Becker, who began building automobile radios in 1945 and aircraft radios approximately ten years later. Today, Becker products are found not only in automobiles and aircraft all over the world, but also in military equipment, especially that used for search and rescue operations. Becker's commitment to safety is clearly shown in its auto radio products which are designed to entertain with safety in mind.

Becker of North America, Inc. has its offices and workshops in Paramus, N.J., in close proximity to the headquarters of most European automobile importers.

CHASE

Today's CHASE is a truly international financial system operating in more than 100 countries through over 200 representative offices, subsidiaries and associates.

Chase provides multinational resources for multinational needs. The more countries become dependent upon one another economically, the more it becomes necessary to have a worldwide network such as ours, one through which capital can flow in a timely and reliable fashion.

Indeed, the rapid development of THE CHASE MANHATTAN BANK as a financial services corporation has been a direct response to the imperatives of global interdependence. And our expansion and diversification philosophy reflect our roles as facilitators of economic development around the world. This we perform best by the broad geographic presence we maintain, and by being in a position to provide the full range of financial services and related products required in any given locale.

Our challenge has been to develop a quality response that meets needs as new requirements emerge. Thus, we brought our services to countries in which we had never operated before. Recognizing the increasing opportunities for East-West trade, we were the first United States correspondent for the Bank of China. And recent burgeoning needs in the Middle East have brought about new Chase strengths there.

Our challenge in the critical years ahead is to continue to expand our operations base in ways that will facilitate our meeting the increasingly international demands of customers, wherever headquartered, of Tomorrow's Chase.

CHEMICAL

CHEMICAL BANK, with headquarters in New York City, is one of the world's leading financial institutions. Now 156

years old, it started life in 1824 as a subsidiary of the New York Chemical Manufacturing Company.

The growth of Chemical Bank has been most evident over the past fifty years. With the acquisition of the Corn Exchange Bank in 1954, Chemical Bank entered the retail banking business. In 1959 it merged with the New York Trust Company, thus broadening its trust facilities, which today are among the most outstanding in the country. With the acquisition of the Security National Bank of Hempstead, Long Island, Chemical now has over 250 branches in the New York area. In 1968, Chemical New York Corporation was formed as a holding company with Chemical Bank as its major asset. Today there are a number of domestic subsidiaries of the holding company including the Galbreath Mortgage Company and Sunamerica Corporation.

Chemical Bank's international business in all industrial and financial sectors has expanded considerably in recent years, and over $17 billion of the Bank's $39 billion in assets are now in the International Division. The expansion overseas, most of which has taken place since 1971, has resulted in the establishment of a network of branches, representative offices, subsidiaries and affiliates in major centers throughout the world, enabling Chemical Bank to assist its customers with whatever their needs may be. To further increase its international capabilities, Chemical Bank has a subsidiary in New York, Chemical International Finance Ltd., which is involved in equity financing outside the United States. C.I.F. also holds equity in a number of foreign banks, among them Breisach Pinschof Schoeller in Austria.

The Frankfurt branch office of Chemical Bank, which opened in the fall of 1969, now employs over 100 people and services an ever growing roster of German, U.S. and European companies.

CITIBANK

A subsidiary of Citicorp

CITICORP/CITIBANK: An Overview

With assets of over $100 billion and more than 1,900 domestic and overseas offices, Citicorp is one of the largest financial services institutions in the world. Its principal asset and subsidiary is Citibank, N.A., which offers banking services to individuals, private corporations, governments and financial institutions. Citibank, N.A. maintains more than 200 overseas branches and has some 325 branches in its home state of New York, and is the second-largest privately owned commercial bank in the world.

Other Citicorp subsidiaries and affiliates engage in such activities as merchant and investment banking, credit card and residential mortgage services, consumer and industrial credit, international trade finance, the development of automated office systems, and the buying and selling of money market instruments.

Together with its subsidiaries and affiliates, Citicorp has $67.8 billion in deposits and $59.5 billion in loans outstanding (as of September 30, 1979). Total staff numbers approximately 51,000, with 25,000 in domestic locations and the remainder overseas.

Citibank opened its first overseas branch in 1914 in Buenos Aires—becoming the first U.S. national bank to branch directly abroad. Over the next four years, in addition to opening more branches of its own in South American cities, the bank acquired full ownership of the International Banking Corporation, which had established its first foreign branch in London in 1902. The resulting network of 21 overseas offices in 13 countries and territories made Citibank America's leading international bank.

After reaching a high-point in the early 1930s, the bank's international operations declined under pressure from a Depression and then a World War, after which it grew slowly until the late 1950s. At that point Citibank's senior management perceived significant new growth opportunities abroad, particularly in Europe, and instituted a program that by 1967 had expanded Citibank's overseas presence from 82 offices in 27 countries to 208 offices in 61 countries.

Throughout the late 1960s and 1970s, Citibank's foreign operations continued to grow rapidly, especially in the developing nations, and during the past few years, 70% or more of the corporation's earnings have come from abroad.

Since the mid-1970s Citibank has committed substantial resources to the expansion of staff, systems and marketing in its worldwide consumer businesses. In 1977, it unveiled its first "electronic" branch, and Citibank's network of more than 200 Citicard Banking Centers (card-activated banking terminals) in the New York metropolitan area now handles nearly 50 million deposit, withdrawal and other transactions each year.

This planned expansion of consumer activities is part of Citicorp's long-term strategy for meeting the challenges of the 1980s.

For thousands of U.S. businessmen their yearly visit to one or more of the international trade fairs staged by the KOELNMESSE—COLOGNE TRADE FAIR CORPORATION—is a must. As exhibitors or visitors they promote via Cologne their export or import not only with the EC countries but with partners from all over the world.

The Cologne program includes 22 international trade fairs and trade exhibitions which have been held regularly for several years, if not decades. They are the official events for the respective branches of German industry and are considered as the most important of their kind in Europe, sometimes in the world. Major industries represented by the different trade fairs are housewares, iron products, leisure and hobby goods (including photography, film, audiovision, sporting goods as well as bicycles, motor bicycles, gardening equipment and arts), food products, furniture, textiles and clothing.

Of the 20,000 exhibitors from nearly 90 countries participating in the Cologne fairs, 50% are from abroad. Of the total of more than 1 million visitors every third visitor is non-German. The United States are represented at the different trade fairs by some 600 exhibitors and 4,000 visitors and thus make up the largest non-European contingent. Since 1970 the number of American exhibitors has doubled, and the number of trade visitors has increased by 60%.

In contrast to the U.S., German trade fairs are in most cases the responsibility of fair corporations which organize the trade events according to a clearly established marketing concept. Most of the fairs are open to trade visitors only. The Cologne Trade Fair Corporation, founded in 1922, is an autonomous and independent business enterprise with a yearly turnover of about DM 110 million (US $60 million) which receives no subsidies of any kind. It has a permanent staff of some 350 specialists and 67 agencies in 59 countries with long established, world-wide contacts with industry, associations, authorities and news media. In the USA it is represented by the German American Chamber of Commerce, New York. The exhibition buildings consist of 14 connecting halls with a floor space of 2.3 million square feet, convention facilities for up to 5,000 delegates and up-to-date service facilities belonging to the Cologne Trade Fair Corporation. The exhibition grounds are situated in the center of the Rhineland metropolis of Cologne and directly linked to the European motorway network.

If Hamburg Has A Secret...

...it's all over the streets!

Goodwill Street

Hamburg has a great world port. You know that, of course.

But when you do business in Hamburg, you suddenly discover much more. It's no secret. Even our street names give it away:

Stock Exchange Street . . . Bell Casters' Street . . . Leather Street . . . Brewery Street . . . Mink Street . . . Pearl Alley . . . Gold Rain Way . . . Liebe-Zeit-Street . . . Goodwill Street . . . !

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HAMBURG

14.2.-22.2.1981	**Leisure '81/Holidays '81** together with Garden '81, Do-it-yourself '81, Hobby '81 and SBB '81 (Do-it-yourself Boat Show)
13.3.-18.3.1981	**InternorGa** International Trade Exhibition for Hotels, Catering, Bakeries and Confectioners
2.4.-5.4.1981	**8th Hamburg Exhibition for Art and Antique Dealers**
26.5.-30.5.1981	**PORTEX '81** International Port Exhibition · Port Planning, Port Construction, Port Equipment in conjunction with Congress
4.9.-13.9.1981	**Du und Deine Welt** Modern Family Exhibition
22.9.-26.9.1981	**Office Equipment Exhibition Hamburg**
15.10.-16.10.1981	**EMTEC Trade Days** European Marine Trade Exhibition
17.10.-25.10.1981	**German Intenational Boat Show Hamburg**
3.12.-6.12.1981	**9th Hamburg Exhibition for Art and Antique Dealers**

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TRADE FAIRS · CONGRESSES + TRADE FAIRS · TRADE FAIRS + CONGRESSES

COMMERZBANK

COMMERZBANK was founded in 1870 by Hamburg merchants and bankers and, through a series of acquisitions and mergers, soon became a leading force in German banking. Today it ranks third in size among German commercial banks and is engaged in all forms of commercial banking, in underwriting, syndicate and investment banking. The emphasis in commercial banking is on short- and medium-term loans, with long-term lending becoming increasingly significant. Retail banking has also experienced rapid growth over the last decade.

The Commerzbank group maintains a domestic branch network of some 885 offices located throughout West Germany and West Berlin, with a staff of well over 21,000. It comprises 20 domestic banking and financial associates, the most important of which are Berliner Commerzbank and Rheinische Hypothekenbank, a leading German mortgage bank.

Foreign activities have a significant part in the Bank's overall business, whose international departments are all located in Frankfurt. Major holdings abroad include a 100% interest in Commerzbank (South East Asia) in Singapore, a 60% stake in Europartners Bank (Nederland) N.V. in Amsterdam and Rotterdam, and a 40% interest in the New York investment bank EuroPartners Securities Corporation as well as holdings in more than 30 other financial institutions in about 20 countries. In addition, Commerzbank operates ten foreign branches—in Antwerp, Atlanta (agency), Brussels, Chicago, Hong Kong, London, Madrid, New York, Paris and Tokyo, and 18 representative offices. In all, the Bank today offers world-wide facilities in 35 countries at more than 75 different locations.

From the very beginning, Commerzbank has maintained especially close relations with the Americas. In 1971, Commerzbank transformed its New York representative office, which was opened in 1967, into a branch—thus becoming the first German bank to operate a full-service branch in the U.S. In 1974, the Bank's U.S. operations were expanded with the establishment of a second branch in Chicago, and in 1979 its presence was further extended through the opening of an agency in Atlanta, Ga.

Commerzbank's performance in 1979 was again satisfactory, shareholders receiving an unchanged 17% cash dividend. The Bank's capital and reserves as of December 31, 1979 totaled DM 2.478 billion, and its balance sheet total amounted to more than DM 67 billion while its consolidated total assets exceeded DM 100 billion.

DG BANK

DG BANK, with headquarters in Frankfurt am Main and two units in the United States (a New York Branch and a Los Angeles Agency), continued the selective expansion of its international network in 1979 and 1980. Most recent additions were Branches in Singapore and in Hong Kong, where the wholly-owned DG Capital Company Ltd. had been operating since 1977. Moreover, DG Bank established a Representative Office in Tokyo.

Of the Bank's consolidated business volume (comprising total assets and contingent items) which expanded by 6.4 percent to DM 60.7 billion—the equivalent of U.S. $35.0 billion—in 1979, more than 18.5 percent was international business; twelve months earlier, it had been 17 percent. The growth reflects a further strengthening of the Bank's position in the Euro-market as well as in German export financing.

Foreign exchange business with commercial clients also continued to grow during the year under review which was marked by considerable rate movements for important world trade currencies—mainly the American Dollar, Pound Sterling and the Japanese Yen.

In the Federal Republic of Germany, DG BANK serves as central bank and liquidity manager for a system of more than 4,400 local banks organized as cooperatives, nine regional banks, and a number of specialized financial institutions. This system, owned by over 8.8 million shareholders, operates some 19,600 offices throughout West Germany. At the end of 1979 its consolidated assets exceeded DM 310 billion (U.S. $179 billion).

DANIEL INTERNATIONAL

DANIEL CONSTRUCTION COMPANY, the major division of Daniel International Corporation, serves world-wide clients in engineering and construction through a strong operating base in the USA and its branch offices in the Caribbean, Europe, and the Middle East.

In addition to serving the power industry, Daniel's activities cover chemical and pharmaceutical facilities, food processing plants, a broad range of industrial installations for pulp and paper, rubber, glass, aluminum, fabrication and assembly plants ranging from electronics to automobiles. The company also is a major builder of commercial and institutional buildings, such as office towers, warehouses, etc.

Daniel normally has more than 250 projects under construction around the world. Their values range from several thousands to billions of dollars. In cooperation with the Fluor Corporation, which acquired Daniel in 1977, Daniel is further concentrating on additional international projects involving China, Japan, and African countries. To supplement engineering and construction, or construction management services, Daniel provides industrial maintenance and an extensive crafts training program.

Degussa Corporation

DEGUSSA CORPORATION is the United States member of the international chemical and metals organization, Degussa AG (Frankfurt). It consists at present of three business groups—Chemicals, Pigments, Catalysts/Metals. In June, 1978 Degussa Corporation completed a 150-million-dollar-plus chemical complex in Mobile, Alabama. Corporate management and marketing responsibility is headquartered in Teterboro, New Jersey.

A major product of the Chemicals division is methionine, an important nutritional supplement for poultry and animal feeds. The Mobile plant is the only domestic manufacturing source for methionine. Other industrial products now produced domestically include hydrocyanic acid and some of its derivatives, such as cyanuric chloride. Sales in sodium cyanide, complex cyanides and active oxygen compounds, such as perborates and persulfates, are still based on imports. Considerable effort is dedicated to introduction of new products.

Aerosil, a fumed silica developed by Degussa, is a principal product of the Pigments Division and has been produced in Mobile since early 1977. Flatting agents, Milori blues, color blacks and specialty precipitated silicas imported from Europe complete the range of the Pigments

Division. A nationwide marketing network consists of Degussa staff, assisted by agents and distributors. Sales have shown a steady and accelerating increase since it began a concerted marketing effort ten years ago that could possibly expand the Mobile operation.

Activated nickel catalysts are receiving wide acceptance in hydrogenation reactions by the chemical processing and pharmaceutical industries, and in a venture with another chemical company Degussa Corporation produces automotive exhaust control catalysts for the American automotive industry.

The Metals Division markets platinum temperature sensors for industrial temperature measurement, plating salts and solutions for the electronic industry, and a full range of ceramic colors for decoration for glass and dinnerware. Completing the cycle, a refining service for precious metal scrap and sweeps is offered.

In October, 1979 Degussa Corporation acquired J. Aderer, Inc., an American manufacturer and major supplier of dental alloys. The new wholly owned subsidiary provides the company with a domestic manufacturing base for dental materials plus an expanded product line and sales force.

Based on domestic as well as overseas production, Degussa Corporation is a growing and increasingly important industrial enterprise in the United States.

Deutsche Bank
A century of universal banking

The DEUTSCHE BANK AG, headquartered in Frankfurt/West Germany, is the largest bank in the Federal Republic of Germany on the basis of assets, deposits, loans or capital. The Bank together with its consolidated subsidiaries is one of the leading banking enterprises with total assets as per December 31, 1979 of $91.6 billion, deposits of $85.1 billion and stockholder's equity of $2.9 billion.

The Bank is engaged in a full range of commercial banking activities such as providing credit of all types and maturities and accepting deposits. In addition, the Bank is, in Germany, active in underwriting, distributing and trading securities and holds equity investments in some of the leading industrial corporations in Germany. The Bank's consolidated subsidiaries are engaged in mortgage lending, investment management, property management, leasing and construction financing. Through Deutsche Bank Compagnie Financiere Luxembourg, the Bank is one of the leading institutions involved in Euro-market lending and loan syndication.

Due to the Bank's size, the broad range of its activities and its close ties with some of Germany's leading corporations, it is an integral part of the German banking system. The Bank's total assets account for approximately 7% of the total assets of all German banks and approximately 5% of the total savings deposits of all German banks.

The New York Branch of Deutsche Bank was established in 1978. The branch is involved in commercial wholesale banking with an emphasis on short- and medium-term lending; trade finance; documentary international business; foreign exchange and money market dealings. Internationally, the branch is concentrating on Latin American business. For international financing purposes, the branch conducts the business of a Cayman Island Branch as a Euro-market activity of the bank.

DRESDNER BANK was established in Dresden on November 12, 1872. In 1873, when the Bank completed its first full year of business, its total assets amounted to just over five million Thalers. More than one hundred years later, Dresdner Bank AG, now with headquarters in Frankfurt/Main, has consolidated total assets of more than DM 121 billion ($70.1 billion as of Dec. 31, 1979), making it the second largest commercial bank in the Federal Republic of Germany and one of the largest banks worldwide.

As a "universal bank," the Dresdner Bank is active in commercial as well as investment banking in Germany and abroad, and offers a full range of corporate and retail banking services. It holds a leading position in placing bond issues floated by domestic and foreign issuers, in managing capital increases of German corporations and in introducing foreign shares to German stock exchanges. The bank plays a prominent part in the domestic and international money and foreign exchange markets as well as in bullion trading.

International banking has always played a prominent role among Dresdner Bank's banking services. In recent years, the Bank has strongly intensified its involvement in the United States and maintains full operating branches in New York, Chicago and Los Angeles and a Representative Office in Houston, Texas. With its 25 percent participation in ABD Securities Corp., Dresdner Bank has also gained a solid position in the U.S. brokerage and investment banking business.

Through the Deutsch-Suedamerikanische Bank AG, Hamburg, a member of the Dresdner Bank Group, and through various other participations, the Bank has traditionally maintained close ties with markets in Central and South America. Dresdner Bank also operates branches in London, Madrid, Tokyo, Singapore and Hong Kong. It has subsidiaries in Luxembourg, the Compagnie Luxembourgeoise de la Dresdner Bank AG—Dresdner Bank International (CLB) and in Singapore, Dresdner (South East Asia) Ltd. (DRE-SEA) and has at present 27 Representative Offices in major financial and trade centers in the world. Last but not least, it is a member of the ABECOR Group (Associated Banks of Europe). All of these demonstrate the local presence that Dresdner Bank prefers for its international activities.

We are happy to serve our customers at home and abroad.

Dynamit Nobel

DYNAMIT NOBEL OF AMERICA INC. (DNA) is a wholly owned subsidiary of Dynamit Nobel A.G. of Troisdorf, West Germany, a diversified chemicals, plastics and ammunition concern with world wide sales of $1.8 billion in 1979. DNA conducts an importing and manufacturing business in the U.S., reaching a volume of approximately $150 million in 1980 with plants in five U.S. states. Its activities are subdivided into three major sectors: Plastics, Chemicals and Sporting Arms/Ammunition.

In the field of plastics, most of DNA's products are based on the processing of PVC (polyvinyl chloride). The best known product is TROCAL Roofing, a vinyl membrane used in flat roofing of mostly commercial buildings. Another product group, TROCAL rigid PVC windows, offers excellent insulation properties for this energy-conscious age. Other products include TROVIDUR rigid PVC and polypropylene sheets for industrial

applications and TROCELLEN cross-linked polyethylene foam for a wide variety of applications from leisure time articles to automotive uses.

DNA's subsidiary, Harte & Co., is one of the leading manufacturers of flexible vinyl sheeting for numerous decorative applications such as juvenile furniture, shower curtains and wall coverings, as well as for industrial and building applications such as pool and pond liners, electrical insulation and medical bags.

In the field of chemicals, DNA's activities are conducted through its 75%-owned subsidiary, Kay-Fries, Inc., with plants in Stony Point, New York, and Mobile, Alabama. Kay-Fries manufactures and imports a great variety of chemical intermediates used primarily in the production of pharmaceuticals, dye stuffs, agricultural chemicals and fragrances. Principal products are ortho-esters, cyanoacetates, phenyl glycine, which is used in the production of synthetic antibiotics, and silanes silicates which are supplied to the paint, foundry and fiber industries and also find application as waterproofing agents.

In the Sporting Goods Ammunition sector, DNA is known for its imported lines of Trap and Skeet Guns, Air Rifles, and Rottweil, Geco and RWS sports ammunition including the unique Brenneke shotgun shells.

EM INDUSTRIES, INC.

EM INDUSTRIES, INCORPORATED, a subsidiary of Merck AG of Zug, Switzerland, and the U.S. associate of E. Merck, Darmstadt, Germany, is a diversified manufacturer of specialty chemicals for many different applications. Most recently, EM Industries acquired the Harleco Division of American Hospital Supply Corporation, thus gaining access to the rapidly growing clinical market in the United States. The Merck group resumed its activities in the U.S. in 1971 with the creation of EM Laboratories, Inc. which was recently renamed EM Industries, Incorporated.

Today, the EM Chemicals Division supplies a wide range of high quality specialty products to the pharmaceutical, food, electronics, optics and plastics and coating industries. During 1978 and 1979 the first phase of a new chemical complex was constructed in Savannah, Georgia, where pearlescent pigments for cosmetic and industrial applications are manufactured. Further expansion of the plant is under construction.

The Rona Pearl Division, which was acquired in 1975, is a major supplier of specialty chemicals to the cosmetics industries. Rona Pearl has pioneered in the development of the first synthetic nacreous pigments approved for cosmetic use. These pearlescent pigments add an irridescent glow to powders, eye shadows, blushers, lipsticks, liquid makeups, nail enamels, creams, shampoos and soaps.

MCB Manufacturing Chemists, acquired in 1977, is one of the oldest, most respected names in the field of laboratory chemicals. MCB has been able to extend its product offerings with the addition of fine laboratory products from E. Merck, Darmstadt, the largest worldwide supplier of high purity chemicals. MCB manufactures and sells close to 4,000 products used for analytical and research purposes in industrial, educational and governmental laboratories.

Center Laboratories, which joined the EM group early in 1979, offers a line of quality controlled, highly effective extracts to the allergist. These biological products include extracts of pollens, molds, dusts, inhalants, epidermals, insects and food which are used to bring relief to allergy sensitive patients.

In addition to these commercial activities, EM Industries conducts clinical research for the Pharmaceutical Department of E. Merck, Darmstadt, and is testing new plant protection products developed by Celamerck of Ingelheim, Germany.

EUROPARTNERS SECURITIES CORPORATION

EUROPARTNERS SECURITIES CORPORATION is the United States' full service investment banking and securities affiliate of Commerzbank (Germany), Credit Lyonnais (France), Nordic Bank Limited (England), Bank Leu (Switzerland) and Banco di Roma (Italy).

The firm was incorporated in New York in 1968 by Credit Lyonnais, under the name of Credit Lyonnais Corporation. The name EuroPartners Securities Corporation was adopted in 1970 when Banco di Roma and Commerzbank became shareholders. In September, 1974, Nordic Bank Limited, a joint affiliate of Svenska Handelsbanken (Sweden), Den Norske Creditbank (Norway), Kansallis-Osake-Pankki (Finland), and Copenhagen Handelsbanken (Denmark), became a shareholder. Bank Leu became a shareholder in 1975.

With emphasis on serving clients in the United States' financial markets, EuroPartners Securities Corporation performs a full range of international investment banking and securities brokerage functions, which represent a portion of the total banking business conducted by its parent banks as "universal" European banking institutions.

In 1968 EuroPartners Securities Corporation was one of the first investment banking and securities affiliates established in the U.S. by major foreign banks. In February, 1979 EuroPartners became the first European-owned U.S. securities firm to become a member firm of the New York Stock Exchange. Today, EuroPartners Securities Corporation is one of the leading foreign-owned securities firms in the U.S. with capital in excess of $8 million, offering a full range of corporate finance, investment management, research and securities brokerage services to an ever broadening group of corporate, institutional and individual clients in the U.S. and abroad.

Investment banking and corporate financial services provided by EuroPartners to European and American client companies include: underwritten public offerings of securities, private placement financing, tax-exempt industrial revenue and pollution control bond financing, mortgage financing for corporate real estate, leverage lease financing, tender offers, merger and acquisition expertise, venture capital financing, financial evaluations, and assistance with debt ratings and U.S. and foreign stock exchange listings.

A fundamental premise underlying the development of EuroPartners' corporate finance services has been an uncompromising commitment to giving client companies the best possible advice and counsel concerning financing or investment banking matters in the domestic U.S. market and international capital markets and to executing financing or other assignments effectively and professionally. U.S. companies look to EuroPartners for responsive and professional corporate finance services. European companies operating in or entering the U.S. market benefit from EuroPartners' extensive experience with the financial, accounting, legal and business problems that its overseas client companies encounter repeatedly in acquiring, developing and financing U.S. operations.

1981

Messeplatz Frankfurt.

Business takes off here.

- **Heimtextil** 14. – 18. 1. 1981
  International Trade Fair for Home Textiles and Household Textiles
- **IMA** 22. – 25. 1. 1981
  International Amusement and Vending Trade Fair
- **Musikmesse Frankfurt** 7. – 11. 2. 1981
  Music Fair Frankfurt · International Trade Fair Musical Instruments, Musical Accessories, Music Publishers
- **Internationale Frankfurter Messe** 21. – 25. 2. 1981
  Frankfurt International Fair
- **ISH** 17. – 22. 3. 1981
  International Trade Fair · Sanitation Heating Air Conditioning
- **Internationale Pelzmesse** 8. – 12. 4. 1981
  International Fur Trade Fair
- **45. interstoff** 5. – 8. 5. 1981
  Trade Fair for Clothing Textiles
- **Internationale Frankfurter Messe** 29. 8. – 2. 9. 1981
  Frankfurt International Fair
- **49. IAA** 17. – 27. 9. 1981
  International Motor-Show
- **Frankfurter Buchmesse** 14. – 19. 10. 1981
  Frankfurt Book Fair
- **46. interstoff** 3. – 6. 11. 1981
  Trade Fair for Clothing Textiles

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EAB
European American Bank

EUROPEAN AMERICAN BANCORP, headquartered in New York City, is the holding company for European American Bank & Trust Company, European American Banking Corporation and Euramlease, Inc. Our resources exceed $7.2 billion.

European American Bank, an American Bank chartered in New York State, is among the top 30 of the 15,000 commercial banks in the United States. We serve a worldwide market and offer a highly diversified range of products and services to consumers, small businesses, middle market companies (firms with annual sales of between $3 and $250 million), U.S. multinational and European corporations, banks and governments.

European American Banking Corporation is an investment company with commercial banking powers, specializing in international finance and foreign exchange. The Banking Corporation has locations in Los Angeles, San Francisco, Nassau (Bahamas), Bermuda and Luxembourg.

European American Bank & Trust Company is a full service commercial bank with over 90 branches in the New York/Long Island area. It is a member of the Federal Reserve System, the Federal Deposit Insurance Corporation and the New York Clearing House Association.

Euramlease, Inc., provides leasing arrangements to companies in the U.S. and abroad.

European American Bancorp is owned by six of Europe's largest banks, with combined resources of over $250 billion. This unique association provides access to a network of over 10,000 banks around the world. Our shareholder banks are: Amsterdam-Rotterdam Bank N.V., Netherlands; Creditanstalt-Bankverein, Austria; Deutsche Bank AG, Germany; Midland Bank Limited, United Kingdom; Societe Generale De Banque, Belgium; and Societe Generale, France.

FAG

FAG BEARINGS CORPORATION is an international organization whose trademark is a worldwide symbol of quality and dependability in the design and manufacture of bearings in all sizes and configurations. FAG is recognized as the signature of one of the world's oldest and largest manufacturers of precision ball and roller bearings. Since 1883 FAG has led the way in the development and refinement of bearing design and technology. Today, FAG employs over 31,000 people in branches and affiliate plants in the U.S.A., Canada, Brazil, Germany, Austria, Switzerland and Portugal. There are, in addition, FAG sales and service offices and distributors in more than 100 countries.

FAG headquarters in the U.S.A. are located in Stamford, Connecticut, where a full complement of administrative, marketing, engineering and distribution personnel service the American market. The chief U.S. production facility is in Joplin, Missouri. Now undergoing extensive expansion, the Joplin plant will be producing by 1982 an extended range of bearing types in sizes hitherto never produced in the U.S. FAG's capabilities in bearing design and manufacturing are second to none. From automobiles to steel furnaces, farm machinery to spacecraft, FAG is ready to provide bearings, housings, accessories and components, whatever and wherever the need.

FedMart*

An abandoned warehouse served as the first location for a small membership store which offered Federal employees a mart in which to shop for quality merchandise at low prices. This was how "FEDMART" derived its name. From its humble beginning in 1954 in San Diego, FedMart has grown into one of the nation's largest mass merchandisers.

The 60's saw more FedMarts open and the dropping of its membership requirement. The company grew in stature, became a public company, and in 1969 its stock began trading on the American Stock Exchange. Today, FedMart stock is also traded on the Pacific Stock Exchange and the company has over 3,700 shareholders across the U.S.

In 1975 FedMart had 44 stores spanning California, Arizona, New Mexico, and Texas in the rapidly growing "Sunbelt", with annual sales of $381 million. That year, a West German retailer named Hugo Mann acquired controlling interest in FedMart. Shortly thereafter, an extensive remodeling and construction program began as existing stores were upgraded with new fixtures and new display and merchandising techniques, modern materials handling equipment and sophisticated computer operations.

In early 1978, major expansion took place with the company's acquisition of twenty-six large stores from other retailers. Within a year most of these were completely remodeled and reopened as full line FedMart stores. As a result, FedMart doubled in size to a total of over 5,000,000 square feet of store building space in 68 stores.

The company's strategy is spearheaded by an aggressive merchandise mix that offers one-stop shopping with over thirty departments, under one roof including a complete supermarket. Both food and general merchandise are checked out through electronic cash registers at the front of the stores. This approach to merchandising is eminently suited to the need to save consumers' time and gasoline and positions the firm well to meet the opportunities of the new decade. The company also vigorously pursues a policy of minimizing operating costs in order to keep prices low on quality products. To meet this objective, the company has pioneered new techniques of product presentation, distribution, computerized ordering and inventory control.

FedMart's annual sales exceed a billion dollars, making it one of the leaders in the industry, and one of the largest firms making its home in San Diego.

FLORIDA

Die kaufkraeftigen Maerkte Westeuropas, Kanadas, Asiens und Lateinamerikas entdecken in zunehmendem Masse die Vorteile des Staates Florida fuer Handel und Industrie, was dazu fuehrt, dass der internationale Handel und Investionen bestens gedeihen.

Foridas strategisch guenstige Lage auf halbem Wege zwischen den Staaten des amerikanischen Kontinents, die natuerlich vorhandenen und noch zusaetzlich geschaffenen Vorteile des Staates fuer den Handel und die Tatsache, dass Florida als suedlichster Bundesstaat als Standort fuer auslaendische Investitionen ganz einfach attraktiv ist—alle diese Kriterien geben Florida einen der ersten Plaetze am internationalen Markt.

Natuerlich werden die Geschaeftsinteressen auch durch das gut ausgebaute Netz an Seehaefen, durch die direkten Luft- und Transporteinrichtungen, die internationalen Banken und die Aussenhandelszonen angelockt, sowie auch durch die multi-nationalen Bueros, Dienstleistungen, eine guenstige Steuer-

struktur und eine Vielzahl von Arbeitskraeften mit guten Sprachkenntnissen.

Der Staat heisst Handel und Industrie aufs Herzlichste willkommen und hat sich stets bemueht, jedes Land wissen zu lassen, dass Florida am Geschaeft interessiert ist. Floridas Handelsministerium unterhaelt nun Bueros fuer Wirtschaftsentwicklung in Stuttgart und Toronto, sowie ein Buero fuer Lateinamerika in Sued-Florida, um den Kontakt mit moeglichen Handelspartnern und Investoren zu erleichtern. Das Buero fuer Lateinamerika befindet sich deshalb in Florida, weil der Staat die Erfahrung gemacht hat-wie ueber 100 multinationale Unternehmen auch—dass diese Maerkte von dort aus besser angegangen werden koennen.

Von Zeit zu Zeit veranstaltet Florida auch Besprechungen zwischen Vertretern des Staates und des Handelsministeriums einerseits und auslaendischen Firmen andererseits, um deren spezifische Beduerfnisse zu eroertern.

Den auslaendischen und amerikanischen Unternehmen stehen eine Reihe von Deinstleistungen zur Verfuegung, wie z.B. Studien ueber Marktbedingungen, Computer—und technische Hilfeleistung, kostenlose Plazierung von "Match up" Annoncen in einer internationalen Publikation, Forschungsarbeit fuer interessierte Firmen, Veranstaltung von Handelsmessen und Hilfe bei der Auffindung des richtigen Standorts.

Florida verfuegt ueber ausgezeichnete Luft—und Wassertransporteinrichtungen, darunter 14 Seehaefen und 13 Flachwasserhaefen. Unter den Vorteilen, die die sechs internationalen Flughaefen des Staates bieten, sind Non-stop-Fluege nach Europa, Suedamerika und den wichtigsten U.S.-Staedten. Gut ausgebaute Strassen runden das Transportnetz ab.

1979 verzeichnete Florida 13 Milliarden Dollar im internationalen Handel. Der Staat besitzt drei Aussenhandelszonen, weitere sind im Bau. 26 Banken bieten internationalen Service. Eine Stadt ist Heimat fuer 19 "Edge Act" Bankgesellschaften und wird nun zum Zentrüm fuer "Master Edge Act" Bankgesellschaften. Diese Banken taetigen auch internationale Geschaefte. Ueber 100 multinationale Firmen haben ihre amerikanischen Bueros in Florida. Weiterhin finden sich auch Zweigstellen auslaendischer Banken.

Eine angemessene und gerechte Steuerstruktur macht den Aufbau von Unternehmen sehr attraktiv. Bei jaehrlich 35.5 Millionen Besuchern kann Florida es sich leisten, die Unternehmenssteuern niedrig zu halten. Florida ist einer der sechs Bundesstaaten in den USA, in denen es keine staatliche Einkommenssteuer gibt—in dieser Beziehung der einzige Staat im Suedosten der USA. Auf Lebensmittel, Arznei oder Haushaltsgueter wird keine Umsatzsteuer erhoben. Ebensowenig wie auf Maschinen oder Ausruestungen fuer neue Produktionszentren. Bei Benzin, Oel, Holz oder Kohle, das fuer Industrieproduktion benoetigt wird, besteht ebenfalls keine Umsatzsteuer.

Floridas vielfaeltige Vorteile, einschliesslich des echten Interesses des Staates an der wirtschaftlichen Entwicklung, bieten dem internationalen Handel und Investitionen ganz erhebliche Moeglichkeiten.

FRANKFURT FAIRS AND EXHIBITIONS, with a worldwide impact on commerce and trade, is one of the largest fairgrounds in Europe. The Frankfurt Fair covers an area of 9.25 acres and offers a total hall capacity of 2 million square feet. But it is the program available to business and commerce and not exhibition area alone which constitutes the importance of a fair, and in this regard Frankfurt is one of the most prominent trade forums in the world. Besides the Frankfurt International Fair in spring and autumn, Europe's "opinion leader" for high quality consumer goods (china, glass, cutlery, gifts, etc.) Frankfurt hosts another biannual event, the "Interstoff." In May and November fashion designers and manufacturers acquaint themselves with the latest trends in clothing textiles. The annual "Heimtextil" fair draws more than 55,000 visitors, and features carpeting, curtains and other types of household textiles. The annual international fur fair, one of the leading trade events in the field, offers products from the fur finishing and processing industry as well as the season's latest designs.

Another annual event is the Music Fair Frankfurt with more than 600 exhibitors of musical instruments and accessories from all over the world. A separate special fair since 1980, it is well on the way to becoming the leading trade fair for the music industry.

The Frankfurt Book Fair, with more than 4,000 participating publishing houses from over 90 countries, is the largest market for book copyrights and translation rights.

In alternate two-year intervals, two exhibitions for the automotive trade are staged in Frankfurt: the IAA International Automobile Exhibition, which attracts more than one million visitors; and the Automechanica, which features equipment for automotive workshops and service stations as well as spare parts and accessories. Other important fairs include: the ISH International Fair for Household Stationary, Heating and Air Conditioning Technology; ACHEMA—chemical equipment and apparatus; IFFA, an international fair for meat processing QEE equipment.

Whatever the direction of the economic graph, the Frankfurt fairs continue to distinguish themselves for the results they achieve for buyer and seller alike. The ever growing participation from all parts of the globe is the best proof of this claim to quality and performance.

Most trade fairs in Frankfurt are not open to the general public but to trade buyers only. They are characterized by an extraordinarily high participation of foreign exhibitors and trade buyers and have become a genuine meeting point for international business.

THE GARRETT CORPORATION produces high-technology flight systems and components and provides numerous aviation services.

Its various disciplines extend across the spectrum of commercial, military and general aviation. Garrett has also increasingly diversified into the rapid transit and industrial fields, applying its aerospace expertise and technology to these endeavors.

Garrett has 18 major divisions and subsidiaries and associated companies in the United States, Canada and overseas. It features 24 distinct product lines, manufacturing more than 5,000 different items for civilian and military, air, ground and marine applications.

Garrett became one of The Signal Companies in 1964, and today has some 22,000 employees—about one-fourth of whom are scientists or engineers.

Major Garrett products include turboprop and turbofan aircraft engines, environmental control systems, and heat transfer, cryogenic and mechanical systems. The company produces a wide range of electronics equipment, pneumatic control, actuation and turbine systems, auxiliary power units, emergency locator transmitters and personnel locater beacons, along with inflatable rafts, slides, slide rafts and life preservers.

Aviation services include design and installation of custom interiors and complete avionics systems, as well as engine and airframe retrofit. Fixed base services are also offered.

In the rapid transit field, Garrett has become a leader in the development and production of electric propulsion systems.

It produces gas turbine engines for industrial and marine use, and is making regenerators for gas turbine electric generating plants in the 60,000 pound class. It is also developing a 500-horsepower gas turbine engine for trucks and buses.

Garrett fuel saving turbochargers are in wide use on trucks, buses, tractors, cars and aircraft. The company also makes iron, steel and aluminum castings for both aviation and industrial use, with much of the output going into Garrett turbochargers, gas turbine engines and aircraft systems.

GENERAL ELECTRIC
U.S.A.

GENERAL ELECTRIC COMPANY, U.S.A., with annual sales of over $22 billion, produces nearly one percent of the total of all goods and services produced in the United States.

It has some 400,000 employees worldwide, manufacturing 250,000 different products at 350 manufacturing plants in 35 states in the U.S.A. and in 24 countries outside the U.S.A.

General Electric's technological leadership is derived from its historic role as the world's largest supplier of systems and products for the production, delivery, and use of electricity. From this core of interrelated electrical technologies, GE has produced discoveries leading to major participation in such areas as chemicals, plastics, medical systems, aircraft engines and ship propulsion systems.

The company offers more products in more parts of the world than any other company. In all, General Electric products are sold in 135 countries. General Electric's international activities accounted for approximately 40 percent of the company's earnings of $1.230 billion in 1979.

Because General Electric products and systems are so widely used throughout the world, it has gained application experience in a broad range of operating environments. The advanced technological expertise the company incorporates in systems, products and services is the result of a 100-year commitment to research and development. In 1979, GE's investment in both company-funded and contract research and development work amounted to about $1.5 billion. Much of this work is performed by GE's 30,000 engineers and scientists as well as 1,300 Ph.D.s, the majority of whom are in research. GE's total of 16,500 active patents is the largest in private industry.

A world-wide network of sales and service experts is available for initial feasibility studies, including the maintenance and repair needed during the operating life of the equipment.

GERMAN RAIL

GERMANRAIL, the largest transportation company in the Federal Republic of Germany, in 1979 employed a total of 332,000 persons and operated a network of 29,000 km of railroad lines. In the last year total revenues amounted to DM 16 billion of which DM 9 billion was earned from freight services and DM 5 billion was income from passenger services.

Over 20,000 passenger trains (an average number per day) were used by over one billion travellers during the past year. In 1979 more than 11,000 daily freight trains transported 338 million tons of goods or 65 billion tonkilometers (40 billion ton miles). The intermodal aspect of freight transportation shows high growth rates for the past several years. In 1979 GermanRail carried 460,000 containers (COFC), 297,821 or 284% more than 10 years ago.

GermainRail has 280,000 freight cars at the disposal of its customers who add another 50,000 shipper-owned cars to the fleet. Roughly 7,000 locomotives are available for train and yard operations. One third of this fleet is for electric operations. Equally, one-third of the network is electrified which produces, however, 83% of all passenger and freight traffic.

The core of the passenger service network is the "Intercity" system (IC) which offers hourly departures among 50 major trade and industrial centers in the Federal Republic of Germany. This elite group of trains has been combined with the "Trans Europ Express" trains to offer an alternate means of transportation especially for the business traveler. The appointments in these trains were designed with the business traveler in mind: secretarial compartments and world-wide telephone service are offered on 50 TEE and Intercity trains. It is also possible to reserve an exclusive conference compartment for a minimum of four first class tickets.

Other GermanRail special fares are: GermanRail Tourist Card; and Frequent Traveller Kilometric Subscription (Grosskunden Abonnement) for 25,000 km and 50,000 km.

In North America more detailed information can be obtained through travel agents, corporate travel departments or the GermanRail Sales Offices in Boston, MA; Chicago, IL; Houston, TX; Los Angeles, CA; New York, N.Y.; San Francisco, CA; Toronto, Ont., Canada.

JOSEPH GRAF & CO.

JOSEPH GRAF & CO. is a medium-sized accounting firm which has been in existence for over 30 years. Several partners and staff members are bi-lingual. Our clients are located throughout the United States. The firm offers services which include auditing, tax preparation and planning, management services, mergers and acquisitions. We have particular expertise in dealing with the German, Swiss and Austrian tax treaties.

Financial statements and tax planning memorandums are prepared in German as well as English. Due to our expertise, we offer a unique type of service to American subsidiaries of divisions of foreign entities.

Greater Cincinnati

Comprised of seven counties within Ohio, Kentucky and Indiana, the GREATER CINCINNATI area ranks as the 15th largest industrial metropolitan market in the United States. The area also ranks 17th in the United States in worker productivity and 16th in total values of export shipments. Hamilton County, in which the City of Cincinnati resides, shipped out $9.515 billion in manufactured goods in 1976, ranking sixth in the nation.

Twenty-four foreign firms have located facilities within Cincinnati, including nine German-based companies. More than 300 national and international firms have also selected Cincinnati as their home base including industrial, retailing and financial institutions. Two foreign-trade zones and two subzones have been established in the Greater Cincinnati area to encourage more importing exporting activities.

Cincinnati's diverse industrial base has stabilized the economy and protected the community against severe national business trends. Among its more prominent manufacturing groups are transportation equipment, food and kindred products, chemicals, toiletries and detergents, and fabricated metal products.

There are other reasons why the *New York Times* has called Cincinnati America's "best kept secret." Cincinnati is linked to the nation and the world by seven major airlines, seven railroad systems, four interstate highways and 30 barge lines serving the Ohio River. The area's cost of living has consistently remained below the national average. Growth in employment

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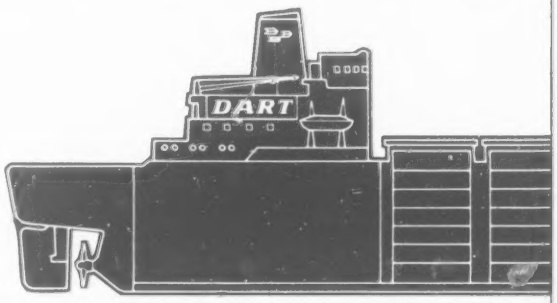

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has always equalled or exceeded the national average, while unemployment has historically been below the national average. Cooperation between business and government leaders has enabled the community to develop a prosperous business climate while at the same time enhancing the quality of life for workers and their families.

Greater Cincinnati is a dynamic, growing community suited for your business developments. Contact us, the Greater Cincinnati Chamber of Commerce, to learn more about our area, and perhaps your company's future.

FAIRS AND CONGRESS CITY HAMBURG: As cultural, communications and economic metropolis, Hamburg has grown into a recognized center for international congresses and fairs. As such, the city is ideally equipped. Situated at the cross-roads of multi-national markets, West Germany's biggest port and industrial city can offer hotel accommodation of 17,000 beds, first-class connections to other cities and countries and a colorful choice of attractive leisure values.

Hamburg's modern exhibition grounds with their 13 halls, covering an exhibition area of 52,500 sq.meters, and the neighboring Hamburg Congress Center, which affords accommodation for 7,500 persons in 16 rooms, present a unique opportunity for combining exhibitions with congresses. About one dozen international specialized exhibitions annually attract more than 1,200,000 visitors, and over 5,000 exhibitors from all parts of the world choose Hamburg as a venue for showing their products and services.

The German International Boat Show (staged each year in October), the specialized exhibition and congress "Ship, Machinery, Marine Technology International" (held every other year in September) and the "InternorGa", International Trade Exhibition for the Hotel, Catering and Bakery Trades, belong to the leading exhibitions of their kind in Europe. This is proved by the fact that all three exhibitions are members of the "elite club" for international trade fairs and exhibitions, the Union des Foires Internationales (UFI). The growing need today for venues where fairs can be combined with congresses is fully catered to in Hamburg by the architecturally and technically magnificent Congress Center Hamburg, one of the most modern buildings of its kind in Europe.

Finally, the halls are so arranged that catering facilities can be provided anywhere in the building.

Hamburg

In the Federal Republic of Germany — West Berlin not included — HAMBURG is the largest city, with a population of nearly 1.7 million. It is, at the same time, one of the 10 states of the federation.

By volume, the city's port is the largest in Germany and during recent years, Hamburg has also evolved as a leading exhibition and convention site.

As a federal state and as a city, Hamburg covers an area of 288 square miles, ranging from densely populated industrial and residential districts to farmland with orchards, fields, pastures and forests.

Tourist Attraction

Hamburg is an elegant city of astounding physical beauty. Two major lakes in the heart of downtown Hamburg are dotted with pleasure and sightseeing boats which also cruise along an extensive network of canals and waterways; and seeing Hamburg by boat is a special treat as it affords a pleasureable way of taking in the beauties of the lakeshore lined with promenades, hotels, impressive office buildings and elegant residences, or the quaint old merchants' buildings of yesteryear along the "Fleets" or canals.

Hamburg is a harmonious blend of carefully preserved and restored historic buildings and the uncluttered lines of modern high-rise architecture. The spires of Hamburg's five major churches still dominate the spectacular skyline.

Hamburg's excellent museums, its state opera and internationally renowned opera ballet, three symphony orchestras, superior international restaurants to suit any purse, and some of Europe's finest hotels have made the city a traditional mecca for tourists from European countries (486,000 in 1979). Recently, Hamburg has been discovered by Americans, as 41,000 visitors from the United States and Canada produced an 11% increase in 1979 over the previous year.

Exhibition and Convention Site

Some of the visitor boom can be attributed to Hamburg's "Messe und Congress Centrum," the ultra-modern convention and exhibition facilities. With 525 major events filling the 1979 calendar (up 73% over 1978), attendance passed beyond the one-million mark. The figures are expected to look even better for the present year, as a record number of national and international events have been booked into the center with topics ranging from solar energy to poultry farming.

Trading Center

Hamburg's prominent role as a hub of industry and commerce came fairly early in its 1,170-year history and received a great impetus during the 13th century, when an alliance with Luebeck provided the cornerstone for what was to become the mighty Hanseatic League. Germany's first stock exchange opened here in 1558. With the immigration of Dutch Protestants, Portuguese Jews and English cloth merchants (expelled from Antwerp), and with the expansion of commercial ties with the United States after 1783, Hamburg continued to prosper.

Hamburg today is an important banking center, as 145 domestic and foreign banks operate in this city. As a consular city, Hamburg ranks second only to New York, with 77 nations represented here by consulates general or consulates. The principal industries in Hamburg are electronics, chemicals and petro-chemicals, machinery and, of course, the large shipyards — to mention just a few.

Port of Hamburg

A prominent factor in the economic life of the city is the Port of Hamburg, a universal harbor, serviced by some 300 scheduled ocean lines. Total cargo volume handled in 1979 reached a record 63 million tons, up 15% from 1978. A number of major projects under construction or on the drawing board are expected to expand and further improve the port facilities. Container traffic is expected to produce an increased share of the business during the next few years from the present 30% to as much as 40 to 45% of all cargo handled.

Hamburg as Business Site

Hamburg's combined domestic product of industries and services in 1979 amounted to $32 billion, twice the per capita average of the Federal Republic.

All these factors combined, plus an international airport, superb overland and waterway routes to all parts of the continent, an excellent public transit system and a selection of choice business and industrial sites make Hamburg an attractive place for foreign investment. Hamburg extends a helping hand to all companies who are interested in locating branches or complete facilities here, especially through the services of the business and industrial consulting office of the city's Department of Economics.

Hapag-Lloyd

The year 1979 saw HAPAG-LLOYD, one of the world's shipping giants, further expand its service to the North American market by taking a number of aggressive operating actions. Each of these steps, according to the company, will better allow Hapag-Lloyd to provide the most competitive, comprehensive transport services in and out of North America. Hamburg and Bremen-based Hapag-Lloyd AG is represented in North America by its subsidiary, HAPAG-LLOYD (AMERICA) INC., headquartered in New York City.

Among the most important recent decisions made by Hapag-Lloyd on behalf of its North American services was the acquisition of two established shipping agencies. The purchases of New York City-based United States Navigation Inc. and United States Navigation (Pacific) Inc. (formerly Balfour Dalgety Marine), San Francisco, gives Hapag-Lloyd a greater ability to intensify its service to shippers and consignees.

Working hand-in-hand with actions such as agency acquisitions is the recent expansion of Hapag-Lloyd's intermodal services. Today, through the efforts of Hapag-Lloyd's intermodal department, many of the company's cargo services offer virtual door-to-door container transport. In addition, by working closely with its agents, Hapag-Lloyd has established a sophisticated network of container pools throughout the United States.

Hapag-Lloyd's growth in non-shipping areas is evidenced by the changing status of the company's travel division. Early in 1980, to allow for Hapag-Lloyd's expansion in the North American travel business, the company acquired Trade and Industry Tour Association, Inc. (TITA). The new office was renamed Hapag-Lloyd Travel, Inc. Most notably, the new organization will be active in commercial business travel, incentive tours, worldwide tourism, and trade fair tours. Based in New York City, with offices in Chicago and Atlanta, Hapag-Lloyd Travel will also represent the North American interests of Hapag-Lloyd Reisebuero GmbH, Bremen, one of the largest travel agencies in Germany.

Germany's largest shipping organization feels that all of these advances are well timed as the company is celebrating the 10th anniversary of its formation, initiated by the 1970 merger of the Hamburg-Amerika Linie and Nordeutscher Lloyd of Bremen. Each company had a rich shipping history in its own right, and today, under the chairmanship of Hans Jacob Kruse, the entire Hapag-Lloyd Group, which includes Hapag-Lloyd AG, has a turnover of DM 2.8 billion. The Group is engaged in liner and tramp shipping, port and offshore services and air passenger service, and employs a staff of almost 11,000 persons.

HARRIS BANK

In 1907 the 25-year-old investment banking firm of N.W. Harris & Company became HARRIS TRUST AND SAVINGS BANK.

The Bank, headquartered in Chicago, Illinois, is based on deposits of $4.9 billion as of December 31, 1979, the third largest Bank in Illinois and the 24th largest in the United States.

The business of the Bank is conducted in three principal areas: banking, investment, and trust.

Banking services are extended to individuals, business, governmental and institutional customers and correspondents throughout the world. The Bank's international banking services, which predominantly include foreign credits and dealing in Eurocurrencies and foreign exchange, are provided through the Bank's headquarters in Chicago, its branches in London, Singapore, and Nassau, Bahamas, representative offices in Mexico City, Sao Paulo, Tokyo, and Paris, and Harris Bank International Corporation, an Edge Act subsidiary in New York City. An international money market representative office was opened in 1980 in Los Angeles.

The Bank's investment department is a nationwide underwriter and dealer in Municipal and U.S. Government securities. This business is conducted from the Chicago headquarters and from representative offices in New York and St. Louis.

The Bank's trust department managed trust assets of $11.6 billion on December 31, 1979, placing it first among Chicago banks. Trust services are provided to individuals, partnerships, corporations and institutions. The department maintains an investment advisory representative office in West Palm Beach, Florida. The Harris Trust Company of Arizona, a subsidiary of Harriscorp, Inc., the Bank's holding company, is located in Scottsdale, Arizona, and serves customers in the U.S. Southwest.

The holding company, Harris Bankcorp, had assets of $7.107 billion on December 31, 1979. It is traded on the New York and Midwest Stock Exchanges.

Charles M. Bliss is chairman and chief executive officer of Harris Bank. B. Kenneth West is president and Robert E. Vanden Bosch, senior vice president and head of the international banking group.

Henkel

HENKEL is an international consumer products and chemicals company with over 90 affiliates in more than 40 countries. Worldwide sales of the Henkel Group totaled DM 6.8 billion in 1979. This figure includes the sales of the former General Mills Chemicals, Inc., acquired in 1977 and subsequently combined with the company's Henkel Inc. operations in the U.S. to form Henkel Corporation, Minneapolis, Minn.

The Henkel Group employs about 33,000 people around the world, with over 2,000 engaged in R&D. In the U.S., research capabilities have been strengthened considerably with the addition of the large technical center of Henkel Corporation in Minneapolis and the R & D facilities of Amchem Products, Inc., Ambler, Penn., acquired by Henkel early in 1980. In the U.S. Henkel is represented by Henkel of America, New York City, founded January 1, 1980, as the parent organization of the American members of the Henkel Group: Henkel Corporation and Amchem Products.

Products manufactured by Henkel include detergents and cleaning agents, personal care products and cosmetics, household care products, adhesives, inorganic and organic products, foodstuffs and packaging materials.

Henkel, headquartered in Dusseldorf, West Germany, is the largest manufacturer of detergents and cleaning agents in the Federal Republic of Germany, ranking second in Europe. Moreover, it is the largest producer of adhesives in Europe and the fourth largest chemical company in Germany. Founded in 1876, the company has made a tradition of high quality products which are safe for the consumer and the environment. Much of the effort of the company's scientists is directed toward the toxicological and ecological aspects of Henkel product use.

In the Federal Republic of Germany alone Henkel spends more than DM 100 million per year in the research and development areas and in production and engineering to assure environmental protection and consumer safety.

Helaba Frankfurt
Hessische Landesbank -Girozentrale

Headquartered in Frankfurt and an integral part of the city's domestic and international banking community, HESSISCHE LANDESBANK is among Germany's top 10 banks, with total assets at the end of 1979 of DM 49.2 billion.

As a large German universal bank concentrating on wholesale banking, Hessische Landesbank offers a comprehensive program of facilities geared to the needs of big corporations, governments and government entities, and other financial institutions. These facilities include:

- International financing with special emphasis on medium-to-long-term fixed-rate DM loans. The Bank's global lending commitments are currently spread over more than 50 countries.
- Foreign trade financing, including documentary credits, letters of credit, government guaranteed export loans, non-recourse export financing (à forfait), and international payments and collections. The Bank is a member of S.W.I.F.T.
- Foreign exchange dealing, not only for the Bank's customers and Hesse's Sparkassen, but also as market maker for its worldwide correspondents in spot, forward, and Eurocurrency deposits.
- International capital market financings, including Euro-DM issues, publicly offered foreign currency issues, private placements, and foreign share placements.
- Investment advisory services and portfolio management. Hessische Landesbank is in permanent contact with banks and securities dealers in all major international security markets.
- Euromarket financing and services through its wholly owned Luxembourg subsidiary, Hessische Landesbank International S.A., a full-service branch in London, and presence in the United States through Helaba American Corp. New York, as well as a representative office in New York which is being upgraded to a branch in 1980/81. These facilities abroad and an active global network of correspondent banks provide Helaba's clients with the full scope of international services.

Hessische Landesbank acts as banker to the State of Hesse and performs clearing and other centralized services for Hesse's 52 regional Sparkassen, both of which are its shareholders.

ISOLIER KAEFER TECHNIK

Established in 1918 in Bremen, West Germany, KAEFER ISOLIERTECHNIK has earned its reputation as one of Europe's leading thermal and acoustic engineering and contracting firms. With over sixty years of continuous experience beginning in the German shipbuilding industry, Kaefer's services include the following: supply and application of all available insulation materials and the development of new techniques; planning and construction of thermal and acoustic insulations for industry, shipbuilding and civil engineering; foodstuffs, petro-chemical and chemical processing; vessel insulation for the transport and storage of liquified gases; construction and insulation of cold and deep-freeze rooms and cells; turnkey cold and deep-freeze storage construction; industrial noise protection; room acoustics, fire-proofing and facade construction. Kaefer is not only able to take over all the planning work involved, but it can provide all the technical staff and craftsmen required.

Today the Kaefer Group is represented through 19 autonomous branches in Germany and through joint companies in Austria, Belgium, Finland, Holland, Norway, Saudi Arabia, Spain, South Africa and the U.S.A.

The Group's activities outside Europe are coordinated by the Kaefer International division, based in Leverkusen, West Germany. Kaefer's technical staff, supported by skilled and experienced construction teams, is available for consultation and project initiation on a world-wide basis.

The activities of the Group's subsidiary in the USA, Kaefer Thermotech, in West Trenton, N.J., were expanded in 1978.

Through the holding company, Insulco, Kaefer has entered a joint venture with the Houston-based B&B International Group. This organization's activities, centered in the fields of thermal insulation for industry and environmental protection, combine traditional German technology, *Gedankenstrich*, through personal involvement, with American craftsmanship.

KANSAS
DAS HERZ AMERIKAS

THE STATE OF KANSAS is a growing center of international commerce in the U.S. Recognized as the world's leader in aircraft production, Kansas manufactures more than two-thirds of all general aviation aircraft marketed in the world. Combined with its number one U.S. ranking in wheat production, Kansas has a strong commercial history in serving the international marketplace.

Located at the geodetic center of the United States, Kansas welcomes interest from international investors. An increasing number of international firms are discovering that Kansas' central geographic location, excellent transportation network, positive labor climate, pro-business attitude and stable government structure are among the economic features conducive to profitable operations here.

Kansas provides a comprehensive package of economic incentives available to international investors. Incentives include tax-exempt bonds for economic development, investment tax credits, freeport tax exemptions, industrial training programs and a duty-free foreign trade zone. Through incentives, Kansas government is committed to providing an equitable tax environment for business to grow. To emphasize the positive business climate, the corporate income tax rate was last changed in 1970.

To assist international businessmen, the Kansas Department of Economic Development provides complete plant location services to potential investors. Upon receipt of a request for information, the agency will assist clients in obtaining the necessary locational data and statistics to make an informed business decision.

Further information on Kansas may be obtained by writing:

John J. Watson, Manager
International Development
Kansas Department of Economic Development
503 Kansas Avenue, 6th Floor
Topeka, KS 66603 U.S.A.

KLOCKNER-MOELLER Corporation is a specialist in the low voltage industrial motor control field and is a subsidiary of the Klockner-Moeller Elektrizitaets GmbH in Bonn, a recognized market leader in West Germany. K-M Corp. combines experience, sound engineering practices and customer service in promoting their full line of quality electrical and electronic equipment. This includes motor control center, main distribution boards, circuit breakers, interruptors, fusible disconnect switches, motor starters, heavy-duty pushbutton units and pilot devices, control relays, and limit switches, engineered custom control

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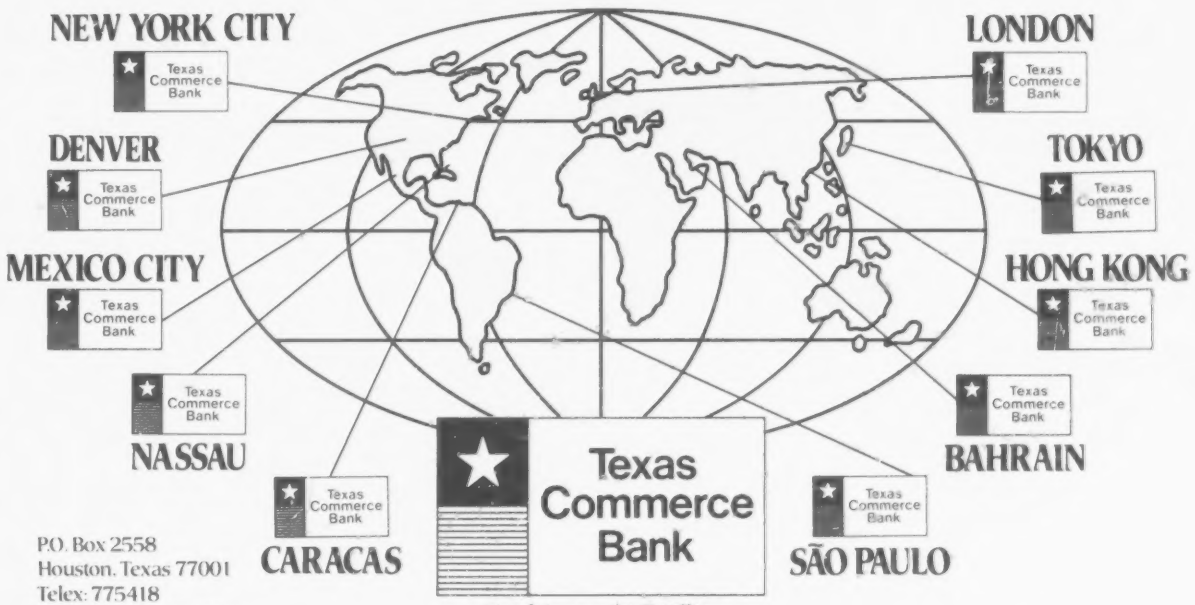

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panels, as well as solid state industrial relays and microprocessor-based freely programmable controllers. Its products are designed and tested to meet all pertinent national and international electrical equipment manufacturing standards.

A unique de-centralized corporate structure enables K-M to provide its customers with direct access to first-rate technical expertise and service. It has established seven independently operating factory branches strategically located across the U.S.A.

Every branch is a fully integrated production and assembly facility which handles the full line of K-M products and features complete engineering and design capabilities. Customer requirements are then met quickly and efficiently. Customer service is not restricted to this country but is extended world-wide in over sixty-eight countries, where K-M subsidiaries are located.

Klockner-Moeller Corporation locations in the U.S.A. are as follows: Fairfield, New Jersey; Atlanta, Georgia; Chicago, Illinois; Houston, Texas; Tulsa, Oklahoma; Los Angeles, California; and San Francisco, California.

KNORR BRAKE CORPORATION

Since Knorr's founding in 1905, based on the air braking and engineering skills of Georg Knorr, Knorr has been a leader in the air brake industry. By 1920, Knorr brakes were on all German railway vehicles and on many European rail and rapid transit systems. Knorr was the first to equip automotive trucks and trailers with air brakes in Europe, and has pioneered in pneumatic industrial control development.

Today, KNORR BRAKE CORPORATION and its subsidiary KNORR BRAKE LIMITED of Canada, are serving the braking needs of the North American passenger railroad and transit system industries. Established as an American company in 1973, with KNORR BREMSE GMBH of Munich/Berlin, Germany as its principal shareholder, Knorr Brake Corporation brings the Knorr Group's billions of passenger miles of experience in solving problems and providing braking systems to move and stop people—safely, reliably and comfortably—to the rail vehicle manufacturers, operators, and riders of North America.

The Knorr Group, with over 10,000 employees worldwide is represented in over 75 countries. Wherever people are tackling problems of braking and pneumatic control, Knorr is a familiar name. With this wealth of technical knowledge and experience, worldwide personnel and production resources, and complete product lines for compressed air and or vacuum braking systems for passenger and freight rail vehicles or road vehicles, industrial pneumatic controls, diesel engines, foundry products, machine tools, electronics and railway equipment such as automatic couplers, the staff of Knorr is serving the power and safety needs of the world.

Knorr's research and development, testing, and design departments are continually working to provide the best systems to meet performance, operating and maintainability needs for freight cars, passenger trains and transit vehicles. On test tracks worldwide, in Knorr laboratories, on test racks, climate chambers, dynamometers, computers and in field-service monitoring, Knorr engineers and technicians are engaged in developing the braking systems of tomorrow, improving the systems of today and working to meet the needs of the rail and air brake industry worldwide.

The Knorr Group product line includes braking systems for rail and motor vehicles, diesel engines from 6 to 8000 hp, machine tools, industrial controls (pneumatic, fluidic, microhydraulic), marine controls, electro-technical and electronic equipment, and foundry products (cast steel, cast iron).

KRUPP INTERNATIONAL, INC.

KRUPP INTERNATIONAL, INC., based in Harrison, N.Y. (Westchester), is a wholly owned subsidiary of Fried. Krupp GmbH, Germany. The parent company specializes in a wide range of industrial products and services, marketing throughout the world. KRUPP INTERNATIONAL, INC. represents the link between its parent company and the ever growing market in the Western Hemisphere. Orders received by KRUPP INTERNATIONAL, INC. in 1979 approximated $60 million.

Regional offices are maintained in Houston, Seattle, Jersey City and Atlanta.

On an ever-increasing basis, KRUPP INTERNATIONAL, INC. acts as prime contractor, rendering sales and service assistance to the parent, as well as affiliated companies. KRUPP INTERNATIONAL, INC. offers German-engineered plants and equipment to the American market and supplies a large part of the hardware through U.S. contract manufacturers and suppliers. Krupp's highly experienced engineering staff provides fast and reliable service for all aspects of international business, encompassing engineering and production facilities ranging from ore to steel and from steel to a wide variety of heavy machinery and equipment for major industries.

The highlights of Krupp's achievements in the U.S. include the country's largest bucket wheel excavator in the coal mining industry, the largest strander in the fabrication of wire rope and two of the three largest Gantry cranes in the shipbuilding industry.

GEBRUEDER KULENKAMPFF

GEBRUEDER KULENKAMPFF, founded in 1806, is an international trading company with a world-wide network of subsidiaries, branches and agencies.

In the 175 years of our existence, we have acquired a leading position in our main import activity, leaf tobacco, as one of Europe's most recognized companies. Gebrueder Kulenkampff is still privately owned and with annual sales exceeding U.S. $120 million, we rank among the leading trading houses within the Bremen business community.

In the field of technical products we have gained a reputation as specialized exporters of machinery, parts and supplies to the minerals, energy, construction and transport industries.

We provide international cement manufacturing companies, underground and open pit mines, mine supply houses, construction equipment distributors, manufacturers and distributors with machinery, process equipment, supplies, diesel parts and a complete range of wear parts. Our specialized parts supply system is aimed at those international mills, mines and processing plants in need of genuine OEM parts, but which find their present purchases too costly. For the cement and mining industry we also render consulting, erection and commissioning services.

In addition to fifteen active international subsidiaries serving our tobacco interests, we have affiliated companies in New York, Montreal and London, as well as agencies in Nairobi, Johannesburg and Sydney for technical sales support.

GK also has a financial interest in INTERTRAC, Gevelsberg, Germany, with a workforce of 800, annual sales of more than U.S. $100 million, manufacturers of crawler undercarriages, OEM suppliers to the world's leading construction and mining equipment manufacturers.

LANDES BANK RHEIN LAND-PFALZ

With total assets amounting to DM 25.7 billion (30th June 1980), LANDESBANK RHEINLAND-PFALZ ranks among Germany's major banks. World-wide it belongs to the top hundred. Being an institution incorporated under public law, it is owned in even shares by Land Rheinland-Pfalz and the savings banks and giro association of Rheinland-Pfalz, which are fully responsible for all the Bank's liabilities. Mainz is the location of the Bank's registered head office and branch offices are maintained in Kaiserslautern and Koblenz. A liaison office in Frankfurt serves as the Bank's link with the stock exchange. In Berlin, Luxembourg, Zurich, and Nassau/Bahamas, the Bank is represented by subsidiaries. The Bank employs a staff of 1,800 and its equity capital amounts to DM 505 million.

Landesbank Rheinland-Pfalz combines in itself the functions of an all-round commercial bank, of an issuing house, of a central giro institution for the savings banks, and of the state's financier.

In the economy's private sector Landesbank Rheinland-Pfalz fosters direct contacts with trade and industry in the Federal Republic of Germany and abroad. It offers its customers the full range of financial and similar services from a commercial bank doing business on domestic and foreign markets. While providing all the classical means of financial assistance, the Bank endeavors to develop in cooperation with its customers individual models of financing which meet the ever more complex and intricate requirements of its clientele. For example, Landesbank Rheinland-Pfalz is one of the pioneers in leasing in the Federal Republic of Germany and holds investments in Deutsche Anlagen-Leasing GmbH, Mainz, and in Deutsche Leasing AG, Frankfurt.

In Luxembourg the Bank is represented by Landesbank Rheinland-Pfalz and Saar International S.A., which participates in international syndicates for the writing of loans and the placing of securities, extends Euro loans, and engages in international money trade.

Nowadays, the foreign transactions of Landesbank Rheinland-Pfalz account for more than 10 per cent of the entire business volume (not including the foreign subsidiaries).

The Bank funds its financial requirements largely on the capital market and is one of the leading issuing houses in the Federal Republic of Germany. Securities issued by the Bank and outstanding in mid-1980 aggregated DM 10.7 billion. For many years, the Bank has participated in the underwriting of loans by German and foreign issuers in D-Mark and other currencies.

LINGEN EXPLORATION, INC., and LINGEN OIL & GAS, INC., Houston, Texas, wholly owned U.S. subsidiaries of DEUTSCHE SCHACHTBAU-UND TIEFBOHRGESELLSCHAFT MBH (DST) of Lingen, Germany, started in 1977 to conduct exploration and production of oil and gas in the United States.

Drawing upon the experience and reputation of the parent company's 60 years in the oil industry, the two U.S. subsidiaries with highly qualified professional and support personnel have full capabilities of originating, screening, and/or operating prospects in every major hydrocarbon province in the United States. So far, the Lingen companies have participated in nearly 100 wells on some 55 prospects with combined success exceeding 60% for all wells.

The Lingen companies will continue to broaden operations by actively participating in prospects offered by other operators and by offering outside participation on prospects generated internally. The companies are cooperating with two other German oil companies whose funds are available for joint investment on a long-term basis through Lingen as operator. It is anticipated that additional European private and corporate capital will be invested with the Lingen companies.

DEUTSCHE SCHACHTBAU-UND TIEFBOHRGESELLSCHAFT MBH, the parent company, has been engaged as a drilling contractor and operator in domestic and foreign exploration and production of oil, natural gas, coal, iron ore, and lignite since 1919. DST also offers worldwide experience in areas such as construction of pipelines, planning and operation of water treatment and supply systems and research and participation in international development projects for mineral resources and energy techniques.

DST, in turn, is a wholly owned subsidiary of SALZGITTER AG, a corporation owned by the Federal Republic of Germany. Salzgitter is one of the country's largest groups of industries, engaged in steel production, shipbuilding, construction of industrial plants, energy and trade.

The Ministry of Economics and Transportation of the STATE OF LOWER SAXONY has programmed its computer to provide ready access to basic data about industrial sites in the State.

If the plans for a future industrial facility provide base data such as specific skilled labor, contiguous space as well as highway, rail, waterway or harbor services requirements, this information is evaluated by the computer in terms of what is available at industrial sites in Lower Saxony. This evaluation results in the recommendation of specific locations best suited to meet the needs of the interested company and serves to provide it with preliminary information as a basis for making an initial selection. Discussions between the company and the Department for Industrial Locations of the Ministry ultimately serve to gather the additional data needed for the decision-making process.

The consultation service of the Ministry of Economics and Transportation of Lower Saxony saves all concerned the time-consuming effort of collecting preliminary information because it operates systematically, purposefully and efficiently.

With 47,500 square kilometers, Lower Saxony is the second largest State (Land) in the Federal Republic of Germany; it has 7.2 million inhabitants and a population density of 152 inhabitants/square kilometer.

Lower Saxony's labor force of 670,000 people works in 3,700 industrial facilities. Overall, 2.9 million people are employed (employment/population rate: 41%).

Lower Saxony is almost ideally located for all industries. It has excellent connections to all Europe: all major European highways cross Lower Saxony, there is ready access to international shipping, and the hubs of major rail and waterways are at your doorstep. Hanover is now one of the most modern airports in Europe.

Lufthansa

LUFTHANSA GERMAN AIRLINES earned a gross profit of DM 78.2 million ($45.1 million) in 1979, down from the previous year's DM 118.1 million ($64.5 million). Net profit was up however to DM 67.5 million ($38.9 million) compared to 1978, because of the inclusion of DM 22.5 million ($12.96 million) from a partial compensation received for damages incurred in a 1973 six-month slowdown by

German air traffic controllers.

Lufthansa received DM 50 million as compensation from the Federal Government for damages from the 1973 traffic controllers action, which enabled the company to pay a 3 percent bonus as well as a 6 percent dividend on the net profit to both common and preferred stockholders.

Production in 1979 totaled 5.36 billion ton kilometers resulting in revenues of DM 4.585 billion ($2.641 billion), while expenditures reached DM 4.560 billion ($2.627 billion). Operating revenue was DM 24.8 million ($14.3 million), almost double the 1978 figure. Costs per unit of capacity offered increased by 6 percent, mainly due to heavy increases in fuel costs—up more than 48.5 percent to DM 802.9 million ($462.6 million). Per unit revenue rose slightly more than costs, however, because of a 12.2 percent increase in capacity sold and moderate adjustments in rates.

Other operating revenue—mainly from technical services, flight training, inflight and ground services—came to DM 67.4 million ($38.8 million) resulting in total operating earnings of DM 92.2 million ($53.1 million), up from DM 71.7 million ($39.1 million) in 1978.

On the non-operating side, there was a loss of DM 14 million ($8.1 million) following a profit of DM 46.4 million ($25.3 million) in the previous year. This was mainly due to the considerable tax burden, poorer earnings by subsidiaries, subsidy for the Bremen Flight School and other irregularly occurring items. These results do not include the book profits realized on sales of used aircraft—DM 98.5 million ($56.8 million)—which were compensated by special depreciations for the present fleet.

The airline has ordered four additional Boeing 747's and optioned two more. The four firm orders include one freighter version and two combis with side-loading cargo doors. The new aircraft, valued at $308 million, will be delivered between September 1981 and March 1982, at which time Lufthansa will be operating 15 Boeing 747's

The 747's will be powered by General Electric CF 6-50 engines. Lufhansa will also spend more than $9 million to outfit its present fleet of 11 DC-10's with new General Electric engines. The new engines— the CF 6-50C 2 — will consume about 6 percent less fuel than the current GE engines.

In the first six months of 1980, Lufthansa transported 6,814,865 passengers on 84,260 flights, a gain of 2.9 percent in passengers and 3.8 percent in flights over the first half of 1979. Revenue passenger kilometers grew 8.4 percent, reaching a total of 9.84 billion.

Cargo at 198,430 metric tons was up 1.3 percent, while cargo ton kilometers at 749.7 million increased 3.7 percent. Mail showed large increases of 25.6 percent in metric tons (26,118) and 13.5 percent in ton kilometers (36.2 million). Total ton kilometers offered increased 12.7 percent, while ton kilometers sold grew 6.4 percent resulting in an overall load factor of 60.5 percent, compared to 64.1 percent in 1979.

Lufthansa now serves 121 cities in 72 countries including ten cities in the United States. Nonstop service between New York and Dusseldorf was begun in April of this year. Business class service, available since January 1979 on North Atlantic flights, is being enhanced with a choice of entrees, attractive china and glassware.

First class passengers on all Boeing 747 flights now have a choice of seating in the main deck first class cabin or, for a small surcharge, in one of the 12 Senator "Sleeper" chairs in the upper deck lounge. The introduction of the 12 sleeper chairs in May of this year has increased first class seating to 44. Passengers in the upper deck sleeper compartment will receive all the amenities of Lufthansa's traditional first class Senator Service.

LURGI

LURGI—a group of engineering companies within the concern of Metallgesellschaft AG, Frankfurt (Main)—is engaged in the design, construction and supply of plant and equipment for the chemical, metallurgical, and other important fields of industry. The three Lurgi companies in Frankfurt, Lurgi Chemie und Huettentechnik GmbH, Lurgi Kohle und Mineraloeltechnik GmbH, Lurgi Umwelt und Chemotechnik GmbH, are engaged in process engineering and plant contracting. Lurgi Corporation in Belmont (Western Division) and New Jersey (Eastern Division), handles the business in the USA. Lurgi Verwalt GmbH is the administrative center for all Lurgi companies.

Subsidiaries, branch offices and representations are located in Amsterdam, Brussels, Caracas, Johannesburg, Kuwait, London, Madrid, Manila, Melbourne, Mexico D.F., Milan, Moscow, New Delhi, New York, Paris, Peking, Rio de Janeiro, Riyadh, Stockholm, Tokyo, Vienna and Zurich. Agents are in more than 40 countries. Lurgi Chemie und Huettentechnik GmbH has the following processing divisions: Inorganic Chemistry; Ferrous Metallurgy; Non-ferrous Metallurgy. Lurgi Kohle und Mineraloeltechnik GmbH is broken down into the following process divisions: Coal Technology; Gas Technology; Petroleum Refining; Petrochemistry; Fiber Technology. Lurgi Umwelt und Chemotechnik GmbH has the following process divisions: Dust Collection and Emission Control; Waste Gas, Water, Air; Thermal Processes; Gotek (surface cooling). Lurgi Corporation provides engineering services for the construction of equipment, plant units and complete plants including planning, design engineering, procurement, expediting, erection and start-up, primarily based on the process know-how of the Frankfurt Lurgi companies.

Activities of the Lurgi Group include supply of complete turnkey plants, single units and equipment based on customer-owned processes, Lurgi processes, licensed processes and standard processes, including erection, start-up and fulfilment of guarantees. Engineering services for complex plants, including planning, design, procurement, expediting, erection and start-up. Research and development services, especially the testing of raw materials and evaluation of their applicability, development of processes and equipment, appraisal of new processes. Consulting services for specific projects, such as petroleum refineries, synthesis plants, fertilizer plants, and metallurgical plants. Licensing of processes and equipment.

Lurgi employs a permanent staff of about 5,000, mostly process engineers, chemists, metallurgists, physicists, design engineers and erection personnel, along with an appropriate commercial organization. Extensive up-to-date laboratories and pilot plants are available for research and experimental work. The Lurgi Group does not depend on company-owned manufacture of equipment, machinery and other plant items, and is, therefore, free to select the best qualified manufacturers on the world market, including the customer's country. The specific organization and engineering practices of the Lurgi Group permit them to suggest and release in each individual case the most suitable type of contract.

M·A·N

M.A.N. is one of the leading European manufacturers of heavy mechanical equipment. With 40,000 employees, it serves essential segments of today's economy, such as basic industries, power generation, transportation, communication, civil engineering, and industrial equipment through research, design, engineering, manufacture, supply, and erection of mechanical equipment as well as complete systems.

The intensive efforts invested in innovation and future-oriented projects, be it for nuclear components, space exploration, transportation systems or new materials, are aimed at continuing M.A.N.'s leadership in engineering (the world's first diesel engine was developed at M.A.N. in Augsburg in 1893-1897).

The company is organized into five product divisions:

Commercial Vehicles

The plants in Munich, Penzberg, Watenstedt and Braunschweig build trucks, buses and municipal vehicles.

Diesel Engines and Printing Machinery

The Augsburg parent plant concentrates on manufacturing diesel engines and printing machines. On July 1st, 1979, M.A.N.'s printing machinery division and ROLAND Offsetmaschinenfabrik Faber & Schleicher were merged into "M.A.N.-ROLAND Durckmaschinen AG." The production facilities continue to exist both at Augsburg and Offenbach/Main. The American printing press manufacturer WOOD Industries Inc., Middlesex, was acquired by M.A.N. in February 1979 and was renamed "M.A.N.-WOOD Industries." The Hamburg plant, with its own pier, offers marine diesel engine maintenance and repair as well as spare-parts service world-wide.

Mechanical and Structural Engineering

The plants in Nuremberg and Gustavsburg produce equipment for power generation, material handling, cranes, hydraulic presses, steel structures, pumps, elevators and escalators, rolling stock, stampings and construction services of complete plants and manufacturing facilities.

New Technology

Future-oriented research projects are carried out in Munich with main efforts in the fields of energy, environment, raw materials, components for nuclear technology, electronics, space exploration, transportation and material technology.

Mechanical and Industrial Plant

GHH Sterkrade specializes in building plant and equipment for mining and the production of iron and steel. The production program also includes turbocompressors, industrial steam turbines, closed loop combustion turbines, components for nuclear technology, screw-type compressors, floating docks and special purpose inland and ocean-going ships.

Outside Germany, M.A.N. is represented by a network of subsidiaries and individual agencies for consulting, sales and service. Further details about M.A.N. may be obtained from the annual report, available in English from M.A.N., Abt. GMI, Stadtbachstr. 1, D-8900 Augsburg, West Germany.

mtu

MTU OF NORTH AMERICA, a subsidiary company of MTU Motoren und Turbinen-Union Friedrichshafen GmbH, is a part of the worldwide sales and product support network of MTU Friedrichshafen for their compact diesel engines with power ratings ranging from 545 up to 7080 HP. It is situated in Sugarland/Houston. MTU of North America's responsibilities are the marketing and support of MTU products and depot of spare parts which can be sent anywhere in the U.S. market.

The new permanent distribution and product support center contains the most modern technical equipment. This allows complete overhauls of MTU engines. Every engine overhauled and reassembled by MTU of North America will be checked prior to delivery or reinstallation on the test stand with respect to performance, fuel consumption and perfect working order of all components. The spare parts depot is established to guarantee availability of parts on a 24-hour basis.

To continue the tradition of high level after-sales support which the customer has been accustomed to for decades from MTU Friedrichshafen, there is a technical team composed partly of MTU Friedrichshafen personnel sent to Houston and partly of U.S. personnel trained intensively in Friedrichshafen for the after-sales assignment.

MTU activities: Development and manufacture of compact diesel engines ranging in output from 545 to 7080 HP, high-output marine gears, flexible and fluid couplings and electronic control and monitoring systems.

MTU Friedrichshafen:

- annual production of diesel engines with over 1.7 million HP output
- annual turnover of over 750 million DM
- approximately 6,000 employees

MTU Group:

MTU Friedrichshafen, together with MTU München—an aero engine builder—forms the MTU Group featuring:

- an annual turnover of over 1.26 billion DM
- approximately 12,400 employees

MAHLE

MAHLE, today one of the world's largest independent manufacturers of pistons of all sizes, designs and materials for internal combustion engines, celebrates its 60th anniversary in 1980.

MAHLE was initially started in 1920 by the brothers Hermann and Ernst Mahle in a small frame work building at Bad Cannstatt, a suburb of the city of Stuttgart, West Germany.

From six employees and one small work shop in those days, MAHLE has grown to an enterprise that employs more than 10,000 people and operates worldwide. Head Office, Research and Development facilities and seven plants in Germany today support MAHLE's worldwide activities. The engine market is served by wholly owned manufacturing companies, by joint-venture operations and licensees in 16 countries of the world. One of the largest subsidiaries is a modern foundry and manufacturing plant in Morristown, TN. This plant with 130,000 sq. ft. serves the most demanding needs of America's heavy duty diesel engine industry.

Even though pistons of all sizes and designs for all applications are still the main product, Mahle has expanded its activities into other products centered around the automotive or engine industry. Oil, fuel and air filters, cylinders, engine blocks and wheels made of aluminum alloys, air compressors and tire inflation gauges, piston pins, cylinder liners and other grey iron castings are amongst the products which are manufactured and sold today by Mahle.

Mahle, truly *the* partner of the automotive and engine industry worldwide, has been reliable in the past as it will be in the future.

Main Hurdman & Cranstoun

MAIN HURDMAN AND CRANSTOUN is a major full-service U.S. accounting firm with 500 partners in 81 offices throughout the country. Its diversified client list includes some of the largest U.S. industrial companies.

In 1979 Main Hurdman & Cranstoun greatly expanded its international capabilities by becoming the U.S. founding member of Klynveld Main Goerdeler (KMG), third largest accounting firm in the world. Its close working relationship with Deutsche Treuhand-Gesellschaft, KMG's prestigious founding member in Germany,

makes it especially well qualified to provide accounting-related services for German-based companies doing business in the United States and for U.S. firms with interests in Germany.

Auditing Services: Main Hurdman & Cranstoun is skilled in the examination of financial statements prepared in response to U.S. or German reporting requirements, and attuned to the needs of regulatory authorities and financial institutions in both countries.

Tax Services: The firm's wide range of tax services includes tax planning; advice and assistance in complying with local national and foreign tax laws; assistance in dealing with tax authorities, and counseling on tax problems of individuals and corporations. Its fiscal expertise extends to other tax-related areas such as mergers and acquisitions, transfer pricing, expatriate tax services, forms of business organization for multinational entities, offshore financing and operating in duty free zones.

Management Advisory Services: Main Hurdman & Cranstoun's advisory services are designed to assist management by providing professional counsel in disciplines where internal expertise is not available. They include advice on designing and implementing management information and financial reporting systems to meet subsidiary and parent company requirements, designing electronic data processing applications, budgeting, production planning, inventory control and project planning.

Main Hurdman & Cranstoun maintains a higher than usual partner-to-staff ratio so that there is close personal attention by partners to each client's needs. All professional services are performed under the constant direction of an engagement partner, who can draw upon the full resources of the firm, including its national and international tax expertise. For U.S. branches or subsidiaries of German companies the engagement partner has the additional support of several KMG Wirtschaftspruefer on assignment in the National Office of Main Hurdman & Cranstoun.

This is the MANNESMANN logo. Originally, it was symbolic of the pioneering ventures of the Mannesmann brothers who invented the seamless pipe-making process. Today it stands for a company that produces a complete range of tubular products with its own steel-making facilities, builds machinery and manufacturing systems and trades worldwide in its own as well as external products.

The following Mannesmann companies offer the know-how, the experience and the capacity of a large corporation.

Mannesmann Pipe & Steel Corporation, Houston, is a vital and experienced marketing organization. Its product range covers steel pipe, sophisticated tubular products and components, rolled steel products, as well as coke and coal. From its five strategically located sales offices, trained specialists provide advice on a comprehensive array of technical-economic questions.

For more than 20 years **Mannesmann Demag Corporation,** Cleveland, has been marketing and servicing systems, projects, machinery, and component products from its American bases. It supplies the steel industry with furnaces, converters, continuous casting plants, rolling mills and forging equipment. It also manufactures material handling equipment and construction machinery as well as process compression and compressed air equipment. Experienced sales and service technicians operate from centers in nine major markets in the USA and Canada. An extensive dealer network operating in the other key locations completes the service organization.

The Rexroth Corporation, Bethlehem, Pa., also a Mannesmann company, is a well-known international supplier of hydraulic systems and components. Applications for its products are found in every sector of industry.

American Lohmann, Hillside, N.J., is a company of 110 employees engaged in the design and manufacture of gear transmissions for high speed, high horsepower industrial aircraft and marine applications. Previously known as Aero Gear Corporation, it holds a 30-year reputation as a quality manufacturer of precision transmissions.

Mannesmann Tally Corporation, Kent, Wash., has been a premier supplier of computer peripheral equipment and data communications products for over thirty years. The company stresses highly reliable products and is now the foremost supplier of matrix line printers and serial printers to satisfy the growing demand for printers ranging in speed from 50 to 500 lines per minute.

Mannesmann International Alloys, Sugarland, Texas, established in late 1972, is an experienced stocking distribution organization. The company maintains large inventories of carbon and alloy steel tubular products for the power and processing industry. Trained personnel provide prompt and efficient service for customer requirements.

The fourth largest U.S. bank and a wholly owned subsidiary of the $45 billion-asset Manufacturers Hanover Corporation, MANUFACTURERS HANOVER TRUST is one of the world's leading international banks. Its ability to marshal large amounts of financing on a world-wide scale has made Manufacturers Hanover an important lender to foreign and U.S. corporations, foreign banks, governments and agencies. The bank maintains a relationship with two-thirds of the "Fortune 500" list of leading industrial companies. Supporting the bank's overseas activities is a global network of over 100 facilities in 40 countries. In addition to more than 3,000 correspondent relationships with U.S. banks, the correspondent banking system extends to more than 1,600 banks in 130 countries.

Besides receiving deposits and arranging loans in all convertible currencies, the bank's International Division provides letters of credit, collections and other documentary services arising from foreign trade transactions. The Corporation's foreign loan portfolio of $12.5 billion is well diversified geographically, with broad representation in Asia, Europe, Latin America and the Middle East.

In West Germany, Manufacturers Hanover Trust operates full-service branches in Frankfurt, Hamburg, Hannover and Duesseldorf, and representative offices in Frankfurt and Munich. The Frankfurt branch, one of Manufacturers Hanover Trust's largest overseas units, handles all customary or commercial banking transactions, including foreign exchange.

The first Western bank to open a branch in Eastern Europe, located in Bucharest, Manufacturers Hanover is increasingly active in financing East-West trade. Manufacturers Hanover's expansion in the Middle East is spearheaded by branches in Cairo and Bahrain, which offer a full range of wholesale banking services.

On the domestic scene, Manufacturers Hanover is a leader in consumer lending. In recent years, the bank's traditional lending activities have been augmented by subsidiaries in consumer finance, mortgage banking, leasing and factoring.

MELITTA, INC., located in Cherry Hill, New Jersey, is the U.S. subsidiary of

Melitta-Werke Bentz & Sohn of Minden, Germany. The parent company, founded in 1909, is wholly owned by the Bentz family, descendants of Melitta Bentz, the founder, and is one of the largest privately owned companies in Europe.

In 1929, when Horst Bentz took over the management of the company, it had 135 employees supplying 90% of German homes with Melitta products. International growth had already started. By the 1950's, the company was making great advances with its foreign subsidiaries. Today, Melitta has manufacturing facilities in 21 countries and sales offices in over 100 countries. Its household products totaled $800 million in 1979. Melitta employs 6,500 people worldwide. U.S. sales were approximately $20 million in 1979.

Melitta's U.S. operations are under the direction of Mr. Otmar Dreher. Headquarters are located in Cherry Hill, New Jersey, where Melitta assembles manual coffeemakers, converts paper to filters, and roasts coffee for the U.S. market.

The Melitta products distributed throughout the U.S. include Melitta's unique cone-shaped filter bag as well as basket filters, disc filters and folded cones. Melitta also markets manual coffeemakers, filter tops, electric coffeemakers, coffee warmers and extra fine grind coffee. All of these products are sold through grocery, department and specialty stores.

Melitta is confident that these products will soon enjoy the same popularity in the U.S. as they do in other major markets throughout the world.

MERCEDES-BENZ OF NORTH AMERICA, the largest single sales subsidiary of the Daimler-Benz AG, has now become a production company as well. With its headquarters located on a parklike site in Montvale, New Jersey, MBNA distributes approximately 12 percent of the parent firm's passenger car production and also sells medium and heavy-duty trucks imported from Brazil, as well as those assembled in its new Hampton, Virginia, plant, which started operation in early June. The plant is the first built by Daimler-Benz in North America. In addition to MBNA, Daimler-Benz—the world's oldest automobile manufacturer—has four other subsidiaries operating in North America.

They are: Daimler-Benz of North America, the importer of Mercedes-Benz products; Mercedes Benz of Canada, importing and administering sales there; Mercedes-Benz Service Corporation, which operates two emissions laboratories and engages in product development activities; and Euclid, the well-known producer of heavy off-road equipment. Euclid operates independently of the other three. MBNA and DBNA made a direct contribution to the American economy, in the form of taxes, customs duties and payrolls, of approximately $105 million in 1979.

In 1979, MBNA dealers sold 52,820 passenger cars and 3,708 trucks. Daimler-Benz's world-wide production totaled 422,159 passenger cars and 256,467 commercial vehicles and resulted in consolidated sales of $15.2 billion. Passenger car production was up 7.4% and commercial vehicle production was up 7.0%, continuing the trend that Daimler-Benz has experienced for more than two decades. MBNA has more than 1,500 employees working out of its headquarters and field offices in Montvale, Washington, Jacksonville, Houston, Chicago, Los Angeles and San Francisco. Cars and trucks are imported through Port Newark, Baltimore, Jacksonville, Houston, Los Angeles-Long Beach, and San Francisco. The MBNA distribution network at the end of 1979 included 409 passenger car dealers and 163 truck dealers.

Founded in 1881 by a citizen of Frankfurt named Wilhelm Merton, METALLGESELLSCHAFT's (referred to here as "MG") initial field was trading in non-ferrous metals and their ores. Against a background of rapidly increasing demand for metals at the end of the last century, occasioned by the impetus of industrialization, the company successfully established an international metals exchange and secured a strong position in it. However, under the leadership of its far-sighted founders, the company was always alert to opportunities in other fields of activity as they developed.

During the course of its colorful history, MG has progressively expanded its geographical, operational and technical range by setting up new subsidiaries and through acquisitions, mergers and participations.

Now MG is one of the leading concerns in West Germany's highly industrialized economy, still concentrating mainly on the metals industry, i.e., ore mining, metallurgy and the processing of non-ferrous metals. The company's activities, however, are not restricted to any one specific industrial category. Its hallmark is versatility: MG is well known in such important and diverse fields as industrial plant installation, marketing of technical processes, transport and chemicals manufacturing.

MG's trading in raw materials, which was originally confined to metals and ores, today involves a number of other commodities including sulphur, phosphates, fluospar, alumina and rubber.

The acquisition, production and distribution functions of the company made it necessary to develop its own fully integrated transport and insurance services. The financial transactions of MG, conducted on an international scale, are carried out by its own bank.

With 100 years of activity in metallurgy—prospecting, exploring, financing, metals production, transport, processing and marketing—the MG Group has accumulated a vast reserve of experience for future ventures in the world of metals.

Today MG is one of the world's leading producers of non-ferrous metals and is a ring dealing member of the London Metal Exchange. It offers a wide range of its own non-ferrous, semi-finished metals, and is an important supplier, via the worldwide Lurgi network, of processing technology for the solution of such current problems as energy utilization, recycling, environmental protection and raw materials exploitation. MG is also assuming an active role in ocean mining technology for the prospecting and extraction of mineral ore deposits from the ocean floor. The subsidiary, Urangesellschaft, assists in the supply of uranium ores.

Finally, it should be added that Metallgesellschaft, with a turnover in 1979 of DM 8.5 billion, and 29,000 employees, ranks as one of Germany's largest industrial concerns. The newly founded Metallgesellschaft Corp., Wilmington, concentrates its activities on the natural resources area and on activities related to the various corporate divisions of Metallgesellschaft.

Morgan Guaranty Trust Company

MORGAN GUARANTY TRUST COMPANY of New York is the fifth largest commercial bank in the United States. It serves corporations, financial institutions, governments, and individuals throughout the world. Owned by J.P. Morgan & Co.

Incorporated, a holding company, its history spans well over a century.

Morgan Guaranty is headquartered at 23 Wall Street in New York City. One of the world's leading international banks, it has offices in major financial centers around the globe and holds interests in local financial institutions, including commercial banks, merchant banking houses, and development banks in 40 countries.

Morgan is known as a "wholesale" bank because it does most of its business with corporations and other institutions of substantial size and complex financial requirements rather than with large numbers of individuals as do "retail" banks. Besides domestic and international banking functions, the scope of The Morgan Bank's operations encompasses the management of trust funds, financial and investment counseling, "money-market" activities, and fiscal agency services.

In Germany, The Morgan Bank has branches in Frankfurt, at Bockenheimer Landstrasse 8, and in Duesseldorf, at Cecilienallee 6, which offer the full range of the bank's services. Kurt F. Viermetz, Vice President, is the general manager for Germany and Peter von Elten, Vice President, as head of general banking, is responsible for the bank's business with corporate customers in Germany.

In New York, Morgan has a group of officers who specialize in serving the banking needs of the U.S. subsidiaries of major German companies. These officers at Morgan's New York headquarters include: Thomas J. Kuhnke, Vice President (212) 483-2379; Cynthia A. Coulson, Assistant Vice President (212) 483-2436; Ralph von Specht, Assistant Treasurer (212) 483-1246.

MMG

With a program of events encompassing 32 fairs, MUNICH is one of the major international trade fair cities. People from all over the world meet at Munich's trade fairs, exhibitions and conferences.

There are noticeable subject concentrations in Munich's trade fair schedule, such as in the electronics and building sectors. Another field which is increasingly moving to the forefront is medicine. Numerous highly qualified consumer-goods fairs have established themselves in Munich as well as those in the capital-goods sector.

Every year, about 1.2 million visitors—most of them professionals—from all continents come to the Munich Trade Fair Center. More than 10,000 of them meet at conferences which are linked up with trade fairs or are held on their own. Approximately 16,000 exhibitors look for and find the demand for their products here. About 10,000 journalists are registered at the Press Center every year.

The Bavarian State capital has the best prerequisites for a trade fair location of the top international order: the geographical situation, traffic connections and other infrastructure advantages, an accommodation capacity of 26,000 beds in more than 400 hotels, economic vitality and numerous sightseeing 'musts' of great beauty and interest in the fields of art and culture. And last but not least—Munich's typical flair for life. All this makes for a trade fair location of unique attractiveness.

NRW

Gesellschaft für Wirtschaftsförderung in Nordrhein-Westfalen mbH

Before you invest, investigate. We're there to help you. The old rule is truer than ever: Before you set up a new plant, you need to know about the most advantageous locations, about industrial properties and property prices, transportation facilities, utilities, waste disposal, local tax rates, available labor, public investment aid, and a host of other matters.

In North Rhine-Westphalia (NRW for short), the most populous state in the Federal Republic of Germany, a highly specialized consulting service is available to answer such questions: GfW, GESELLSCHAFT FUER WIRTSCHAFTSFOERDERUNG IN NORDRHEIN WESTFALEN MBH (Economic Development Corporation for North Rhine-Westphalia Ltd.), at Kavalleriestr. 8-10, D-4000 Duesseldorf. More than 5,000 companies so far have drawn on the comprehensive knowledge of this organization.

The company's experienced consultants know what's important. They know the country like the back of their hand; they know the key people and the proper channels. Their information and counsel are individual and strictly confidential. They suggest locations, locate properties, provide figures and contacts. They are fast and anything but bureaucratic. And they cost the client nothing. The State of North Rhine-Westphalia bears the entire expense. The Minister of Economic Affairs of the state is chairman of the GfW board.

In short, nobody knows NRW better than GfW. Nobody has more know-how, know-where, and know-who.

Reason enough, surely, to call on the NRW specialists before you invest in North Rhine-Westphalia.

NIXDORF®
COMPUTER

NIXDORF COMPUTER CORPORATION is the North American subsidiary of Nixdorf Computer AG, West Germany, a pioneer in the manufacture of easy-to-use work-station oriented computer systems. Founded in 1952 as the "Labor fuer Impulsetechnik" by German scientist and businessman Heinz Nixdorf, Nixdorf AG has grown in the past 28 years to become a major manufacturer of computer systems noted for their ease of use, human engineering and modularity of design.

With over 70,000 installations and reported 1979 worldwide sales revenues of $722 million, Nixdorf ranks today among the leading international computer manufacturers.

The company owes much of its success to innovation and a willingness to provide end users with a wide range of support services.

Nixdorf AG employs a total of 12,000 personnel, including 1,700 in the U.S. Nearly two-thirds of this number are engaged in service and support activities adapted to the needs of specific industries and business areas.

The largest of Nixdorf's international subsidiaries, Nixdorf Computer Corporation is headquartered in Burlington, MA and has sales and service centers in 120 locations in the U.S. and Canada, as well as sales distributorships in 20 cities in the U.S., Canada and overseas.

The company has a full complement of research, manufacturing, marketing, service and administrative personnel totaling over 1,700.

Nixdorf Computer Corporation manufactures and markets a broad range of data entry, distributed processing, word processing and hand-held computer systems. The expanding Nixdorf product line has achieved broad acceptance in the North American marketplace. Major users include J.C. Penney, McDonnell Douglas, U.S. Steel, Burger King, Pan American World Airways, and the Social Security Administration.

In 1979, Nixdorf Computer Corporation acquired the manufacturing and marketing rights for a hand-held computer from Lexicon, Inc., Miami, and renamed that operation Nixdorf Computer Personal Systems, Inc.

In May, 1980 Nixdorf AG moved to enter the plug compatible mainframe market by acquiring the Computer Software Company, Richmond, Virginia. That company, now called Nixdorf Computer Software Company, is one of the most successful independent suppliers of IBM and IBM-compatible operating systems and data base management software for the

Systems 360, 370 and 4300, with 1000 customers in 21 countries.

Nixdorf Computer Corporation has an installed base of 7,000 computer systems and 6,000 customers in North America. 1979 revenues, showing a compounded growth rate of 40% per annum since 1977, totaled $100 million.

O&K

ORENSTEIN & KOPPEL was founded in Germany in 1876. Originally a producer of railway and mining equipment, the company today manufactures hydraulic excavators, rubber-tired loaders, motor graders, mobile cranes, forklifts, diesel locomotives, subway trains, railcars, buses, escalators, ships, deck cranes, floating cranes, floating dredges, bucket wheel excavators, shockers, stackers, reclaimers, plant and machines for crushing and grinding.

With main manufacturing facilities in Germany, the company maintains a network of nine factories, 12 subsidiaries and 190 agencies. Known for precision engineering and advanced design, the company name carries with it a reputation for excellence as O&K products are used increasingly throughout the world. Today, at manufacturing and assembly facilities established in Dundas, Ontario, O&K excavators are being produced with the same precise manufacturing techniques, quality control and product testing as they have been in Germany for many years. Factory-trained experts and dealer staffs stand ready with technical advice and service support.

Through its subsidiary, O&K Orenstein & Koppel Inc., O&K markets hydraulic excavators in North America. The machines range from 35 kW to 1730 kW, with bucket capacities from 3/8 to 40 cu. yd. O&K's U.S. headquarters are in Clifton, N.J.; sales and service training facilities for dealer staffs are also located here. A constantly expanding network of reliable dealers sell and service O&K hydraulic excavators in the United States. A comprehensive inventory of parts maintained in Dundas and Clifton, N.J. facilities assures prompt delivery of replacement parts.

PAN AM

Germany is one of PAN AMERICAN WORLD AIRWAYS' most important worldwide points of passenger origin—a fact that is reflected in Pan Am's air schedules. Outside the United States, no other country is served with more Pan Am flights.

Pan Am flies to six German cities: Berlin, Frankfurt, Hamburg, Munich, Nuremberg and Stuttgart. There is nonstop Pan Am service from Frankfurt to Bahrain, Bombay, Delhi, Karachi, London, Miami, New York and Warsaw. In addition, Pan Am offers direct flights from Frankfurt to Bangkok, Hong Kong, Los Angeles and Tokyo.

Pan Am also provides nonstop service from Hamburg to London and from Berlin to Zurich.

Within Germany itself, Pan Am's Internal German Service links Berlin with Frankfurt, Hamburg, Munich, Nuremberg and Stuttgart with 228 weekly roundtrip flights; Pan Am, in fact, has a fleet of 12 Boeing 727s based in Berlin to provide the service, and a full complement of pilots, flight engineers and flight attendants also are based in Berlin.

Major long-distance routes from Germany include twice daily nonstop 747 flights from Frankfurt to New York, three weekly nonstop DC10 flights from Frankfurt to Florida, and Pan Am's famed daily round-the-world 747 service, which links Frankfurt with ten other major cities. Westbound, Flight 1 takes passengers from Frankfurt to London, and beyond to New York. Eastbound, Flight 2 serves destinations in the Middle East, the Indian subcontinent and Thailand, and then continues east, with daily service to Hong Kong, Tokyo and Los Angeles.

Pan Am also is a major cargo carrier in Germany, with seven weekly 747 freighters from Frankfurt nonstop to New York, and a once-a-week 747 freighter from Frankfurt to Dubai and Delhi. Pan Am also has five weekly 727 freighter flights from Frankfurt to Berlin.

Pan Am's interests in Germany extend beyond the airline itself. Pan Am's wholly owned subsidiary, Inter-Continental Hotels, has major hotel properties in Cologne, Dusseldorf, Frankfurt, Hamburg and Hannover, and affiliates in Berlin and Munich. These facilities provide over 2,000 bedrooms.

Pan Am will celebrate its 35th anniversary of service to Germany in 1981. Pan Am inaugurated flights to Berlin and Frankfurt in 1946, and the airline's German network was expanded to Munich and Stuttgart in 1948. Hamburg became a Pan Am city in 1950, and the airline began service to Nuremberg in 1954.

Prapin

PRAPIN CORPORATION, located in the heart of New York City's fashion district, is wholly owned by Mr. Dieter Schorner and his wife Prapin Schorner. Prapin Schorner is the first and only one-designer dress house to produce their own fine silk dresses in New York City. Prapin Schorner is the designer of the Prapin Line, which is young, classic, and elegant. Miss Prapin created her own method of producing high-quality garments which retain a custom-made quality in maintaining their original elegant, soft, clean, well-fit design. Miss Prapin believes that elegance in a high-quality garment is a major element in the complete design.

Prapin is a very young designer line, but her talented creations and her professional experience have attracted top department stores in the major cities of the United States. Within a year she plans to increase production sharply. In the twelve-month period from spring of 1980 to 1981 output will be raised from 600 units to 3,000 units, without counting small orders. Prapin Corporation has another plan for the future: a joint venture with a German firm to facilitate entry into European markets. In Europe, the line will be called "Prapin Schoerner".

PREUSSAG

PREUSSAG was founded in Berlin in 1923. The company developed out of a purely mining-oriented company into an enterprise that on its own as well as through participations is principally engaged now in manufacturing and trading metals, in transportation, energy and construction activities worldwide. Preussag's world sales total about DM 8.2 billion. With DM 315 million in capital stock and approximately 13,000 employees, Preussag AG, parent company of the Preussag Group, ranks among the top 50 industrial enterprises in West Germany.

Preussag's capacities for producing 220,000 metric tons of zinc and 160,000 metric tons of lead annually provide the company, a major operator of lead and zinc mines in the Western World, with a 50% market share for these metals in the Federal

Republic. Preussag's metal business also includes prospecting and exploration, mining and processing of ores as well as the processing of non-ferrous metals.

In 1978 Preussag expanded its business in metals significantly with the acquisition of a majority in Amalgamated Metal Corporation Ltd. (AMC), London. The AMC-Group is principally active in international metal trading, zinc smelting, mining, as well as other industrial activities. Recently the Preussag Group also intensified its prospecting, smelting and international trading activities in North America.

The entire transportation interests of the Preussag Group have been combined in the Vereinigte Tanklager- und Transportmittel GmbH (VTG), Hamburg, a wholly owned subsidiary of Preussag. With a fleet of 26,000 tank and other special railroad cars, the company is the largest private lessor of railroad tankwagons in Europe.

In addition, VTG operates supply vessels as well as ships on interior waterways. Its fleet includes more than 90 ships in the Offshore Supply Association plus more than 70 vessels serving inland shipping.

The activities of the Preussag Group, which in the past were largely concentrated in Germany, have become significantly more international in recent years on the strength of the company's metal, building and offshore shipping business. In the future, too, the company expects to expand its operations in international markets.

Rodenstock

THE RODENSTOCK GROUP, with headquarters in Munich, is one of the world leaders in ophthalmic optics. The family-owned company entered its second century of operations in 1977 under the management of Professor Dr. Rodenstock, currently the president of the Federation of German Industries (BDI). In addition to three plants and eleven branches in Gemany with over 6,000 employees, there are three German and eleven foreign subsidiaries with several manufacturing facilities. The latest acquisition of the Rodenstock Group, in 1978, was Wernicke & Co. (WECO) in Duesseldorf, one of the leading manufacturers of automatic processing equipment for opticians.

Rodenstock products cover a wide range: ophthalmic lenses, a comprehensive line of plastic and metal frames and sunglasses, precision optics for commercial, industrial and scientific applications including photographic, enlarging, reproduction and X-ray objectives, as well as a complete line of ophthalmological refracting and diagnostic instruments.

In the United States, the Group maintains the following operations: Rodenstock U.S.A., Inc., Danbury, CT; Rodenstock Corporation, Yauco, PR; Rodenstock Instruments Corporation, Sunnyvale, CA; Rodenstock Precision Optics, Morton Grove, IL.

Refracting and diagnostic instruments produced in Germany and the WECO instrument line are represented in the United States by Coburn Optical Industries.

Steady growth and expansion have marked Rodenstock's engagement in the United States in recent years.

THE SCHENKER STORY. The story of the Schenker enterprise is the story of an ingenious package of ideas. The grouping of goods for shipment in consolidated lots for the purpose of achieving lower freight rates, the idea of keeping under control the entire range of services necessary to be performed when offering the customer a true door-to-door movement even beyond national borders. The man who put this idea into practice was Gottfried Schenker (1842-1901). Thus, he became one of the pioneers in the history of modern transportation. On July 1, 1872 he founded, together with other investors, the enterprise Schenker & Co.

Today, on five continents in more than 100 countries and at some 350 places worldwide, the experts of Schenker are at your disposal. 17,000 specialists think, plan and work for you. More than 100 air freight centers and air terminals make Schenker one of the biggest air freight forwarders in the world. There are Schenker maritime offices in more than 100 of the most important seaports worldwide. The organization has available more than 3,000 vehicles ranging from light trucks to special tractors for heavy loads, a combined storage in excess of 5.5 million square feet and last but not least a staff of experts for the shipment of plants, animals and valuables.

In the United States, Schenker has offices in Atlanta, Baltimore, Boston, Charlotte, Charleston, Chicago, Dallas, Denver, Houston, Jacksonville, Los Angeles, Miami, Milwaukee, Minneapolis, New Orleans, New York, Norfolk, Philadelphia, Richmond, Salt Lake City, San Francisco and St. Louis.

SMS

Together with its international affiliates, SMS SCHLOEMANN-SIEMAG AG, a joint venture of the leading German machinery company Gutehoffnungshuette Aktienverein (GHH) and Siemag Weiss KG, is engaged in building machinery and plants for the steel and plastics industry.

To meet the machinery needs (continuous casting equipment, rolling mills and presses) of the steel and non-ferrous metal industries, SMS and its affiliates

- Concast AG, Switzerland (continuous casting equipment)
- Schloemann-Siemag Inc., Pittsburgh, Pa.
- Sutton Engineering Co., Pittsburgh, Pa. (presses and straightening machines)

market a comprehensive line of equipment, including

- complete plants
- hot rolling mills
- cold rolling mills
- shearing line equipment
- strip treatment equipment
- continuous casting equipment
- rod and tube extrusion presses as well as forging presses
- presses, forging equipment
- plus auxiliary equipment.

Representative of the activities of SMS in the mill equipment sector in North America are Schloemann-Siemag Inc., Pittsburgh and Sutton Engineering Co., also in Pittsburgh. In the plastics processing machinery sector, business is conducted by the Battenfeld-Gloucester Group, an SMS member company. It markets plastic processing machinery components and equipment for

- injection molding
- extruding
- blow molding
- foaming

In the United States the production, distribution, engineering and service activities are performed by

- Gloucester Engineering Co., Inc., Gloucester, Mass.
- Battenfeld Corporation of America, Chicago, Ill.

SCHOTT

A third IR-100 Research Award in 10 years and the start of construction on a new research and development facility highlighted the past year for SCHOTT OPTICAL GLASS INC. of Duryea, Pennsylvania.

Schott Optical Glass Inc. is a subsidiary

of Schott Jenaer Glaswerk. The company employs more than 600 people.

The company shared the IR-100 award for its work on neodymium-doped flurophosphate laser glass, which is used in the laser fusion system of the U.S. Department of Energy (DOE) at Lawrence Livermore National Laboratory in California. The IR-100, given by Industrial Research/Development magazine, recognizes the 100 most significant technical products of the year.

The DOE program at Livermore is an attempt to imitate the natural energy-producing fusion process of the sun. Schott research resulted in production of laser glass discs that met the extremely demanding specifications of the project. In addition, a continuous-melting process was developed for the system's non-active glass elements.

In May of 1979, the company announced that it would build a 32,500 square-foot research and development laboratory at its Duryea plant. Construction of that facility began recently. Up to 80 new jobs at Schott will result.

The announcement of the new laboratory came at the climax of the company's Western Hemisphere Marketing Meeting, another 1979 highlight. Sales representatives from 13 Western Hemisphere nations and executives from Schott's German parent joined with officials of the company for a four-day series of meetings and seminars.

Schott's decade in America has seen the company expand its plant seven times, growing from 69 employees to its present size while becoming America's leading optical glass maker.

Schott and the United States have long shared a close relationship, characterized by the U.S. Army's dramatic moving of Schott personnel from Jena (now in East Germany) to Mainz in the Western Zone. That occurred in the closing days of World War II. The company was founded in the 1880's by Ernst Abbe, a physicist; Carl Zeiss, a lens maker and Otto Schott, a ceramic scientist.

Schott makes over 400 types of glass. In addition to basic forms such as slabs, rods, gobs and blocks, Schott optical products include laser glass, radiation shielding glass, color filter glass, fiber optics, Cerenkov counter glass, cathode ray tube (CRT) glass and more.

Schott's ophthalmic products include patented High-Lite, a high-index, low density family of glasses especially suited for strong prescriptions. Schott also makes a complete line of photochromic lens materials, helios for cutting haze in sportsmen's lenses and eonite, uniquely formulated to give ultra-strength when treated.

Schott officers are Dr. Franz E. Herkt, president; Dr. Wolfgang Berthold, executive vice president of operations; John G. Gulbin, vice president of finance and Dr. Karl-Heinz Mader, vice president.

SCHRODER, MUNCHMEYER, HENGST & CO.

SCHRODER, MUNCHMEYER, HENGST & CO., is one of the largest private banks in Germany. It is organized as a limited partnership. The equity capital is owned by the general partners and their holding companies and to a small degree by close associates. Schroder, Munchmeyer, Hengst & Co. was formed on January 1, 1969 through a merger of the two Hamburg private banks of Schroder Gebruder & Co. and Munchmeyer & Co. as well as the Offenbach/Frankfurt private bank of Friedrich Hengst & Co. Schroder Gebruder & Co. and Munchmeyer & Co. had both been founded in 1846. Their business was import/export finance as well as the full range of merchant banking. Friedrich Hengst & Co., originally founded as S. Merzbach & Co. in 1832, was dedicated to the finance and development of industry in the Frankfurt area in which important equity participations were sometimes taken. With limited resources at its disposal, it seemed imperative for the newly merged Schroder, Munchmeyer, Hengst & Co. to identify areas of specialization. This was partly achieved by concentrating on the proven areas of expertise of the predecessor banks and partly by creating new services.

Commercial banking is conducted in the sense of a wholesale merchant bank, concentrated in three locations. It is the policy to provide only short-term funds, money needed for inventory rather than plant and equipment. This led to a growing effort in short-term foreign trade finance. Activities also include foreign exchange operations, letters of credit, and such. Except for the Luxembourg subsidiary, Schroder, Munchmeyer, Hengst International S.A., there are no overseas branches.

Although commercial banking will continue to be the mainstay of the overall business of the bank, the most satisfactory progress in recent years was achieved by the securities division. Highly professional service is being provided to institutions and substantial individuals at home and abroad. While our research staff is expected to know Germany best, the investment horizon is decidedly international. Our wholly owned subsidiary Schroder, Munchmeyer, Hengst-Investment-GmbH manages mutual funds for inhouse distribution as well as for institutional clients.

SCHUMAG MACHINERY, INC., located in Norwood, New Jersey, is a wholly owned subsidiary of Schumag GmbH, Aachen, West Germany.

The Aachen works, acquired and established by F.W. Schumacher 150 years ago, have provided and produced many ideas and inventions still benefiting today's highly sophisticated metals processing industry. By continuous applied research, Schumag has improved the quality and diversification capability of its machinery, maintaining at all times a position of leadership in the metals industry worldwide.

The first Schumag combined drawing machine was delivered to a German steel mill nearly half a century ago. In 1934 the first Schumag machine was imported to the U.S. They were marketed through independent distributors until the end of 1972, when the formation of a U.S. subsidiary was announced. Schumag's international business operations are channeled through two wholly owned subsidiaries in the United States and the United Kingdom, as well as 39 sales representatives throughout the world. Production lines manufactured by Schumag are in actual operation in over 50 different countries.

Schumag Machinery, Inc. at Norwood, N.J., under the leadership of its President, Mr. Max Meier, is an established concern directed to provide sales, engineering and manufacturing services to the United States and Canadian markets. The facilities occupied by the firm since 1980 amount to 16,000 square feet of plant and office space on a four-acre tract of land, envisioning imminent expansion of its business operations.

In order to provide a complete product line mix to the industries it serves, Schumag Machinery, Inc. has undertaken representation and manufacturing license agreements with George Fischer of Schaffhausen, Switzerland, Kieserling & Albrecht of Solingen and Reinking-Kolbus of Rahden, West Germany. These firms bring about a complete integration of services and equipment to the cold finishing industry by Schumag Machinery, Inc. and confirm the solid commitment made to the market during the early Seventies.

SIEMENS

SIEMENS CORPORATION is a high-technology manufacturer of electrical and electronic components, instruments and systems and is the major U.S. affiliate of Siemens AG, Munich/Berlin.

With its consolidated companies, Siemens Corporation operates numerous manufacturing plants serving both the U.S. and world markets. It is also active in the operation of several other companies.

During the past year and a half, Siemens Corporation has continued its selected investments in the U.S. with six new acquisitions. Companies in which we acquired full control are: Microwave Semiconductor Corporation, which manufactures solid-state microwave devices and components; Databit, Inc., a producer of electronic communications equipment; Aerotron, Inc., which makes two-way radio and mobile telephone equipment; the power semiconductor operations of FMC in Broomfield, Colorado, that has been renamed Sitronix, Inc.; Crystal Technology, Inc., a producer of single-crystal products; and Siemens Gammasonics, Inc., a manufacturer of nuclear and ultrasonic medical diagnostic imaging equipment and radiation detection badges. Another addition is Superior Cable Corporation, a wholly owned subsidiary of Siecor Optical Cables Corporation, a joint venture of Siemens Corporation and Corning Glass Works. Superior Cable manufactures telephone cables, telephone cords and elevator cables.

Today, Siemens Corporation continues to broaden its product spectrum. Its diverse product line includes: X-ray and electromedical equipment, dental operatories, tantalum capacitors, zener diodes, stored-program electronic PABX's, electronic Telex and TWX machines, subfractional HP electronic motors, computerized engine analyzers and analytical X-ray equipment.

Siemens Corporation, with headquarters in Iselin, N.J., has manufacturing facilities in Cherry Hill, N.J.; Cheshire, CT, Scottsdale, AZ, and Anaheim, CA. In addition, operating companies in which Siemens holds full or partial interest include: Aerotron, Inc., Raleigh, N.C.; Crystal Technology, Inc., Mountainview, CA; Databit, Inc., Hauppauge, N.Y., Elema-Schonander, Inc., Elk Grove Village, IL; General Numeric Corp., Elk Grove Village, IL; HCM Graphic Systems, Inc., Great Neck, N.Y.; Litronix, Inc., Cupertino, CA; Microwave Semiconductor Corp., Somerset, N.J.; Osram Corp., Newburgh, N.Y.; Siecor Optical Cables, Inc., Horseheads, N.Y.; Siemens-Allis, Inc., Atlanta, GA; Siemens Gammasonics, Inc., Des Plaines, IL; Siemens Hearing Instruments, Inc., Union, N.J.; Siemens Medical Laboratories, Inc., Walnut Creek, CA; Sitronix, Inc., Broomfield, CO; Superior Cable Corp., Hickory, N.C.; Transcontrol Corp., Port Washington, N.Y.; Utility Power Corp., Bradenton, FL. Siemens also maintains over 40 branch offices in key marketing areas throughout the Unites States.

SIEMENS-ALLIS, INC.

SIEMENS-ALLIS, INC. is a broad-line electrical supplier specializing in electrical equipment for electric utilities and general industry. It is jointly owned by Siemens and Allis-Chalmers. Siemens is one of the world's largest electrical equipment manufacturers renowned for quality products incorporating leading edge technology resulting from a large research and development program.

Allis-Chalmers is a diversified U.S. producer of heavy apparatus and equipment for industry whose electrical products have long been recognized for their durability and dependability.

Literally, Siemens-Allis represents the best of both worlds. It incorporates research and development and a solid technological base with modern production facilities and proven experience in the engineering, manufacture, sales and service of a broad line of electrical products. These include electric motors from 1-hp to 100,000-hp, switchgear, motor controls, electronic devices, DC contactors, panel boards, power switches, power regulators and power circuit breakers. All of its products are designed to meet the rigid standards of U.S. electrical utilities and industrial power users.

With 14 U.S. production facilities and over 5,000 employees, Siemens-Allis stands ready to serve both domestic and international customers with high-powered technology and a sensitivity to changing needs.

Siemen-Allis locations are as follows: Corporate Headquarters, Atlanta, Georgia; Medium Motor & Generator Division, Norwood, Ohio; Small Motor & Generator Division, Little Rock, Arkansas; Large Rotating Apparatus Division, West Allis, Wisconsin; Electronic & DC Products Division, New Orleans, Louisiana; Control Products Division and Custom Control Division, Wichita Falls, Texas; Switchgear Division, West Allis, Wisconsin, Raleigh and Sanford, North Carolina; Power Breaker Division, Jackson, Mississippi; Power Regulation Division, Gadsden, Alabama; Power Switching Division, Portland, Oregon; and Circle AW Products Company in Portland, Oregon, Pomona and Modesto, California.

In addition, Siemens-Allis has its own network of twenty-five service and repair centers in 22 cities and a field service operation which covers the whole country.

HCST

HERMANN C. STARCK, INC., of New York is a wholly-owned subsidiary of Hermann C. Starck, Berlin, a leading European producer of refractory and special metals.

HCST was established more than 50 years ago and has extensive production facilities in Goslar, at the foothills of the Harz mountains and in Laufenburg, Baden, near the German-Swiss border.

Tungsten, molybdenum and tantalum as metals and as compounds are HCST's principal products.

Modern production facilities for mineral dressing, chemical processing and pyrometallurgical and hydrometallurgical treatment, supported by extensive laboratories and R & D activities give HCST an unusual degree of flexibility in treating almost all types of raw materials in the special metals area.

Borcher's Co., a wholly-owned subsidiary of HCST, is Europe's leading producer of drying agents for the lacquer and paint industry and also of cobalt and nickel salts for plating and other applications.

HCST Inc. is responsible for the marketing of Starck's products in North America and also for the purchasing of some of the raw materials for Starck's operations in Europe.

In 1976 HCST substantially extended its activities in the U.S. by establishing NRC Inc., which took over the Metals Division of Norton, in Newton, Mass., together with Samincorp.

NRC is a leading producer of tantalum mill products. Participation in NRC has been a complementary addition to HCST's activities in Europe.

S/R
We build brands

STIEFEL/RAYMOND ADVERTISING INC., New York City, is a full-service advertising, marketing and public relations agency that has vast experience in working with German clientele. Founded in 1966.

Stiefel/Raymond approaches each project with fresh thinking and enthusiasm, and applies sound principles in marketing its clients' products and services.

"We Build Brands." S/R's registered trademark, means more than creating advertising. It means involvement from the very top and attention to the smallest detail. It means producing increased sales through innovative concepts and executions, unique media selection, coordinated sales promotion and public relations programs. And, most of all, S/R provides solid product positioning and marketing direction. For each and every client, account management, creative media and production experts work closely to maximize budgets and achieve the greatest impact, sales and profits.

S/R functions as both an advertising and public relations agency for a wide variety of independent and corporate national and German organizations. The agency is capable of providing help with currency exchange rates, taxes and material procurement, as well as basic marketing research.

Herbert J. Stiefel, president of Stiefel/Raymond Advertising Inc., has served a large number of manufacturers and marketers who are based in Germany. "In working with such a diverse list of clients, we feel that we have gained a true understanding of the problems and opportunities faced by German organizations of all kinds." says Stiefel. Some of the clients include W. Goebel Porzellanfabrik; VARTA Batteries; 4711; Hapag-Lloyd AG; Schwan Stabilo; Haarmann & Reimer GmbH, a Bayer Leverkusen subsidiary; Quelle International; Musterring; Medima-Werke; Austrian Airlines; Bruderhaus Maschinenfabrik; and Jenaer Glaswerk Schott & Gen.

Stiefel/Raymond's Marketing Division aids clients by recommending the most likely distribution channels in which a new or foreign product can build its brand. The agency also assists in the identification and selection of key distributors and sales personnel. The size of the company and whether it is based in North America or abroad does not deter Stiefel/Raymond's marketing skills. The agency has been retained by the giants as well as by clients who hope to become leaders in their field.

In addition to its New York offices, S/R has a full-service office in London (Davis, Gibson Advertising Ltd.) and affiliated agencies in Nuernberg, Paris (Intensiv Werbung GmbH) and Duesseldorf (DeRuiter GmbH). These facilities are available to clients at any time.

STINNES

STINNES CORPORATION, with sales of more than $1 billion, is continuing its rapid growth by providing a wide range of key products and services to American industry. The company's financial resources, together with its flexibility, service orientation and international scope, have enabled it to become an important contributor to the U.S. economy, with 1,500 employees in 15 plants and numerous regional offices throughout the country.

Stinnes is a major rebuilder and reconditioner of diesel locomotives, large marine and stationary diesel engines and reciprocating pumping and compressing equipment such as that used in natural gas transmission. Stinnes also plays an important role in the world market for used machine tools, including the purchase of excess production plants, contract maintenance and conversion and reconditioning of single machines or whole plants.

Distribution through a network of more than 1,200 distributors is a rapidly growing service offered by Stinnes. The company acts as a manufacturer's representative and/or master distributor for a wide range of industrial products and supplies including special purpose vehicles used in industrial plants and mining operations, tooling components, machine tools and other metalworking equipment and mill supplies.

Stinnes companies are leading manufacturers of a variety of tooling supplies which are marketed through a network of more than 800 U.S. distributors. Stinnes products, used for precision metal fabricating, include drill jig bushings, dies and die buttons, retainers and punches.

Stinnes' trading operations involve refined petroleum products, petrochemicals, fine chemicals, steam and metallurgical coal, minerals, ferro alloys and steel. As a trading company, Stinnes acts as export/import manager, handling all aspects of international trade for producers who wish to participate in global markets without the associated complexities and risks.

Stinnes Corporation is wholly owned by Stinnes AG which, in turn, is a subsidiary of VEBA AG, the largest public company in West Germany.

Stinnes AG, with annual sales of more than $6 billion, owns or holds an interest in more than 250 companies, together employing more than 21,000 persons.

VEBA AG, with annual sales in 1979 of over $18 billion, ranks just ahead of the 10th largest U.S. industrial corporation.

Texas Commerce Bancshares, Inc.

TEXAS COMMERCE BANK-HOUSTON is the lead bank of the $9.7-billion Texas Commerce Bancshares, Inc. Texas Commerce Bancshares consists of 39 member banks in 19 Texas cities including the major ports of Beaumont, Brownsville, and Corpus Christi as well as Houston. The International Group is headquartered in Houston with additional offices in eight foreign countries. Texas Commerce Bancshares was ranked by the *New York Times* as number one among the nation's top 25 banking organizations in 10-year asset growth rate. *Fortune* ranked Texas Commerce Bancshares number one among the nation's top 25 in return on assets and in 10-year compound growth rate in earnings per share.

International expertise is provided through the staff at the headquarters in Houston as well as through the eight foreign offices in Bahrain, Caracas, Hong Kong, London, Mexico City, Nassau, Sao Paulo, and Tokyo. This group is able to offer a full range of international banking services including foreign exchange, letters of credit, funds transfer, Eurocurrency loans, and export-import financing. For further information contact the—

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THYSSEN

THYSSEN INC., a wholly owned subsidiary and member of the West German Thyssen Group, is an international trading organization and holding company for Thyssen interests in U.S. coal mining operations and has its headquarters in New York City.

The steel products of the Thyssen mills as well as industrial products of various Thyssen enterprises have been sold in the U.S. for many years. As the demand for these products increased, it became necessary for the Thyssen Group to establish a company in the U.S. to facilitate

communications, order entries, and more complete market penetration between Thyssen and its customers.

Thyssen Inc. was founded in late 1959. Since its formation, Thyssen Inc. has continually expanded its U.S. operations. In the mid-1960's, Thyssen Inc. began exporting steel and industrial products for American producers while at the same time increasing the sales of Thyssen mill and other industrial products.

Thyssen expanded its direct domestic sales representation with offices in Houston and Los Angeles and with the formation of divisions and/or subsidiaries to handle and establish various additional lines of business.

In the 1970's, Thyssen entered the domestic market of steel warehousing with the establishment of Thyssen Metal Service/Southwest and later on with Thyssen Metal Service/West Coast and Thyssen Metal Service/Southeast. These steel service centers and distributors supply the Southwest, Southeast, Northeast, the Midwest, the Great Lakes areas and the West Coast, respectively, with steel rolled mill products.

At the same time, Thyssen Inc.'s International Division established a worldwide business in raw materials, mainly coal and iron ore, steel scrap and secondaries, semi-finished steel as well as fertilizers and industrial chemicals.

Today, the combined operations of Thyssen Inc. employ over 200 people in various parts of the country. The company's activities include international steel and raw material trading, warehousing and steel service center operations as well as sales of industrial products.

With such dynamic growth, Thyssen Inc. has become a major factor in the domestic steel community and in international trading.

UNION-TRANSPORT, with its headquarters in Duesseldorf, Germany, was established in 1926. It has since developed into an international transportation organization with about 2,000 employees, providing industry with over 50 years of experience.

In 1959, Union Air Transport, an affiliate of Union-Transport, was established in New York—the first foreign air freight forwarder after the war in the United States. Within a few years Union Air Transport spread out into Canada and England. Union Air Transport presently operates 12 branches in the United States and Canada under the direction of General Manager Hans J. Haefner. In 1976, the Federal Maritime Commission granted Union Air Transport a license to act as an independent ocean freight forwarder operating out of the World Trade Center in lower Manhattan.

With total sales amounting to almost $30 million in 1979, Union Air's operation ranks among the top air freight forwarders in North America.

VEREINIGTE DEUTSCHE METALLWERKE AG (VDM), a product division of Metallgesellschaft AG in Frankfurt, consists of twenty domestic and five foreign production operations employing about 17,000.

In 1979/80 sales of the VDM Group totalled about $800 million of which 40% represented exports. VDM sales offices in many European, North and Latin American countries as well as in Japan play an increasingly important role.

VDM manufactures products out of high-value metals and alloys as well as packaging for many purposes. The automotive and electrical industries as well as builders of machinery and plants in Germany and abroad are the principal customers.

VDM Technologies Corp., New York, with offices in Chicago and Houston, was founded in 1980, VDM's 50th year, with the aim to strengthen the company's position in the important North American market, to intensify its customer relations and to expand its technological cooperation. Vereinigte Deutsche Metallwerke Canada Ltd. has been established in Toronto and Calgary for a number of years.

For the American market VDM supplies products (pipes, sheets, strips, wire etc.) out of nickel and materials with nickel content, titanium, zirconium and special high-grade steels to conform to any international standard, such as ASTM, ASME, BS, DIN etc. for chemical plants, offshore installations, power plants, automotive industry and ships.

VDO ADOLF SCHINDLING AG, based in Schwalbach near Frankfurt, is one of the major manufacturers of instruments in the world. VDO today manufactures instrument combinations for all leading automobile manufacturers. Speedometers, tachometers, clocks, oil temperature and oil pressure gauges, thermometers, voltmeters and ampere meters, compressometers and tire gauges, tachographs and gasoline gauges as well as a comprehensive automobile instrument program put out by VDO.

As for the less known VDO subsidiaries, the *DRD* and *OTA* companies will be consolidated by 1981 to form *VDO Mess- und Regeltechnik GmbH*, enabling the latter to offer complete product lines in the pneumatic and electronic measuring and controller instruments and systems field as well as pressure gauges of all types.

In the clock sector, *VDO* cooperates with *MATRA* in a European holding company comprising such illustrous names as IWC and Jaeger LeCoultre.

VDO Vertriebsgesellschaft GmbH, a direct distribution company, carries comprehensive product lines of supplementary automobile equipment, marine instruments, operating data collection and parking systems.

The *Bevauge* company manufactures small engines, pumps, and automobile accessories. *VDO Luftfahrtgeraete Werk* manufactures aeronautical instruments, both of the conventional and the technically most advanced kind, among them the head-down displays which will play a dominant role in the flight decks of the future.

The most sophisticated microelectronic circuits and displays are developed and manufactured by *VDO Mikroelektronik und Displaytechnik GmbH*.

VDO operates internationally, with its own affiliates in Autralia, Brazil, Great Britain, France, the Netherlands, Austria, Switzerland, Singapore, South Africa and the USA. The company is represented in a total of 56 countries on all continents by representatives and subsidiaries. VDO customers can rely on a network of agencies and service shops for their supplies, with 52 VDO outlets in the USA alone.

This impressive record of entrepreneurship is a sure indication of the caliber of VDO, a company that attained its size by persistently aiming at top quality in its products to meet its customers' expectations.

VEREINS-UND WESTBANK is the first Hamburg-based bank to open a representative office in New York City.

Formal opening took place on May 13, 1980. Because of his long and broad experience gathered in the U.S. banking business, Mr. Ulrich G. Pendl, Senior Vice President of Vereins-und Westbank, has been appointed manager of the bank's representative office.

Forming an integral part of an impressive financial network, Vereins-und Westbank represents Northern Germany's largest regional bank. With altogether 263 branches spreading over the three Federal States of Schleswig-Holstein, Hamburg and Lower Saxony, with a staff numbering 4,100 persons, and with assets of DM 8.3 billion and total deposits of DM 7.6 billion, Vereins-und Westbank ranks amongst those credit institutes that can look back on long experience and tradition.

The bank's international business has been expanding appreciably during the past years. Short-term financing of import and export trade plays a dominant role in the bank's international activities, with commercial transactions being handled with nearly all countries of the globe. International lending business has, meanwhile, assumed sizeable proportions. At year-end 1979, the total volume of loans extended to foreign borrowers by the bank and its subsidiary company in Luxembourg amounted to roughly DM 1.75 billion (equivalent to about 20 percent of total lendings).

The Luxembourg subsidiary company has been operating successfully in the Euromarket business ever since it was established 8 years ago. The bank's foreign exchange business covers both spot and forward dealings trading currency. Close contacts are maintained with foreign exchange dealers in New York and other financial centers in the United States.

The Securities Department offers a wide range of services to customers at home and abroad. Producing the largest turnover at Hamburg Stock Exchange, Vereins-und Westbank acts as an investment banker, manages discretionary accounts and sells various mutual funds. Customers are offered additional facilities of financial counselling and security analysis. Agency services such as investment consultation, investment management, custodian and discretionary accounts have markedly increased. The bank's international syndicate business has expanded substantially during recent years. In 1979, for example, Vereins-und Westbank participated in 36 U.S.-domestic issues and acted as underwriter in altogether 157 Euro-currency issues. Moreover, it took part in all DM bond issues floated by domestic and foreign borrowers.

VILLEROY & BOCH

There are two marketing arms of VILLEROY & BOCH in America. Villeroy & Boch Tableware Ltd. markets dinnerware, crystal, giftware, and collectibles. Villeroy & Boch USA Inc. markets ceramic wall/floor tiles and kitchen/sanitary fixtures.

VILLEROY & BOCH TABLEWARE LTD., 41 Madison Avenue, New York, New York.

Originally founded as Ceramar Incorporated in 1969, the operation was converted into a wholly owned V&B subsidiary in 1976 under the direction of Carlo H. Piccoli. V&B Tableware Ltd. is charged with the marketing of all V&B branded dinnerware, crystal, giftware and collectibles, as well as Heinrich porcelain dinnerware, German stainless steel, and selected glassware and hand-painted faience from Italy. V&B products can be seen in showrooms in Boston, Minneapolis, San Francisco, Los Angeles, Dallas, Atlanta, and the organization's new 41 Madison Avenue location in New York. In all, eight sales organizations market V&B products in America, with a field force of 40. 1980 has seen V&B move out aggressively into consumer advertising media with major schedules in House & Garden, House

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Beautiful, Bride's Magazine, Modern Bride, Gourmet and The New Yorker. The thrust of V&B's consumer and trade communications is perhaps best expressed in the campaign theme, "More than a little continental—the look most found in the fashionable households of France, Belgium and Germany."

VILLEROY & BOCH USA INC., Pine Brook, New Jersey.

Founded in 1975, VP and General Manager Thomas M. Cantwell Jr. took the General Headquarters to Pine Brook in 1978, effecting a 400% increase in warehouse capacity.

The Pine Brook operation is comprehensive, featuring many model room sections. A large selection of the thousands of different patterns of wall and floor tiles, coordinated with kitchen and sanitary fixtures is shown. In addition, the company offers distributors and dealers the unique "Expomat" display furniture, a series of versatile modular display elements for their showrooms.

A consultation room for distributors and their customers is part of the operation, as Villeroy & Boch USA now has on its staff the interior designer, Laurie Johnson, who will work closely with designers, architects, decorators and distributor customers. The warehouse holds more than 1-1½ million dollars' worth of inventory, and approximately 400 different ceramic floor and wall tile items are on hand for prompt shipment.

In September 1980 V&B opened a new operation at 3111 East Mirraloma Avenue, Anaheim, California. Headed by Acting Branch Manager Kathie Anthony, the west coast branch incorporates sales offices, showroom facilities and warehousing, bringing major freight rate and service improvements influencing the Pacific, Rocky Mountain and Midwest territories.

The parent company, VILLEROY & BOCH, is headquartered in Mettlach, West Germany, and is a major manufacturer of ceramics, with 18 factories in France, West Germany, Luxembourg and Italy.

VOLKSWAGEN OF AMERICA, INC. was formed in October 1955 as a wholly-owned subsidiary of Volkswagenwerk AG, Wolfsburg, West Germany. Originally established as the official importer of Volkswagens to the United States, VWoA has also served as the official importer of Porsche sports cars and Audi models since the establishment of its Porsche+Audi Division in 1969.

VWoA corporate headquarters is located in Warren, Michigan. Marketing of cars imported and manufactured by VWoA is through offices in Englewood Cliffs, New Jersey, and distributing companies which serve two separate dealer networks—one authorized to sell and service VW's and the other handling Porsche and Audi vehicles.

Manufacturing divisions within VWoA include an assembly plant in Westmoreland County, Pennsylvania, a sheet metal stamping plant in South Charleston, West Virginia and an air conditioning and automotive component plant in Fort Worth, Texas. VWoA has recently acquired another production facility in Sterling Heights, Michigan, which is scheduled to begin operation in the second half of 1982.

Under the direction of James W. McLernon, President and Chief Executive Officer, VWoA is also responsible for developing national sales programs, preparing and distributing technical and sales literature, developing and supervising training programs for service mechanics, maintaining inventory control over replacement parts, producing and placing national advertisements, administering insurance programs and conducting many other activities to ensure the continued success of Volkswagen, Porsche and Audi in the U.S. market.

Ward Howell International

After operating under the name of Ward Howell Associates for 28 years, the firm changed its name to WARD HOWELL INTERNATIONAL to more clearly reflect the multi national character of its clients.

During 1980, two additional offices were opened, thus putting partners into Amsterdam, Brussels, Dusseldorf, London, Paris, Sydney, and Tokyo, while adding Greenwich to the U.S. roster of New York, Chicago, San Francisco, and Los Angeles. Negotiations are currently under way in Latin America. The professional staff now numbers 41 men and women who in turn are supported by some 60 additional research and administrative individuals.

Early in the year, the company acquired its own in-house computer which will be able to serve the various U.S. offices through installation of terminals in each location. This will give every partner instant access to some twenty thousand personnel files and corporate profiles.

The last years have shown continuous growth in revenues for the firm. Growth exceeds inflation by a generous margin and, consequently, reflects that even during down trends in the business cycle the demand for senior management is not easily satisfied. Both 1979 and 1980 saw a very strong increase in recruitment of executives for the Arab nations both in the public and private sector. Executives sought for this market are primarily found in the U.S. and the U.K. In addition, there has been a very steady growth of business from the central European countries with emphasis on Germany, France, Holland, and Switzerland.

We believe that 1980 and 1981 will be very satisfactory years because of the continuing demand for senior marketing/sales executives, the growth of European interests in the U.S., the tremendous demand for executives of all kinds in Germany and France, and because of the excellent conditions in Australia.

WestLB

WESTDEUTSCHE LANDESBANK came into being as a result of a merger on January 1, 1969 between Rheinische Girozentrale and Provinzialbank, founded in 1832. West LB is an universal banking institution and it now ranks among the world's 13 major banks, with a 1979 total group business volume of more than DM 139 billion. The Bank's guarantors are the State of North-Rhine Westphalia, its two regional authorities, and the State's two savings bank associations.

The Bank's particular historic strength lies in long-term investment credits, municipal loans, and mortgage loans. The basis of its structural strength is the Bank's exceptional capacity for placing securities,

together with a substantial deposit business, which guarantees a sound liquidity structure. West LB finances its operations by issuing its own securities and maintains stock exchange offices in Duesseldorf and Frankfurt.

In recent years, West LB has added to its traditional role in the long-term market a strong new emphasis on short- and medium-term credits in the domestic and international markets. These loans are denominated in all major international currencies. Thanks to its own broad refinancing business, West LB is able to offer a comprehensive range of credit facilities, tailored to the specific needs of its borrowers.

Investment banking constitutes an important part of West LB's sphere of activity. The bank is one of the world's leading issue houses and serves as manager or co-manager of bond and stock issues for both German and foreign public and private entities. It is also active in the mergers and acquisitions business.

In the past few years the Bank has constantly expanded its network of branches, subsidiaries and representative offices. West LB provides its clients with universal banking services through its branches in New York, London and Tokyo and its subsidiaries in Luxembourg, Hong Kong and Brazil.

West LB New York offers a broad spectrum of flexible banking services tailored to the needs of the multi-national firms already doing business in the United States. As West LB has the capability to package its financing to suit U.S. market requirements, credit in the U.S. can be quickly arranged.

The Bank's presence abroad and its participation in internationally operating financial institutions make West LB a strong partner for all engaged in international business.

OTTO WOLFF, headed by the Cologne-based OTTO WOLFF AG, is an international enterprise. The Group operates in a wide field of trade and production, with steel processing and machine and industrial plant installations representing the company's strongest sector.

One prime center of activity is the production and distribution of tinplate, cold rolled sheet and electric sheet. Incorporating all the latest functional technology, these materials meet the diverse demands of the packaging, automotive and electrical industries.

Profile steel, concrete reinforcement steel, steel constructions, screws, and plastics round out the program.

Another significant part of the Group's activities involves construction of highly specialized and complex technical apparatus. Whether in precision machines or measuring instruments, drilling rigs, earthmovers or material handling systems, heavy machinery or complex industrial equipment, OTTO WOLFF's predominance in achievement and technology is beyond question.

With a constant eye on the market, ready to adapt Group structure to change, with first-rate service and distribution performance and with strong financial power, OTTO WOLFF is a reliable and trustworthy partner.

International marketing, based on a network of the Group's own overseas subsidiaries and agencies, guarantees rapid adaptation to current market trends.

The United States market is acquiring growing significance in OTTO WOLFF's international operations, as the continuous expansion of the U.S. network shows. Today, the Group is represented by the OTTO WOLFF US-Holding Corp., Chicago, with bases and affiliated companies in the key regional markets of the U.S.

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CARL ZEISS, INC. is part of the worldwide ZEISS organization headquartered in West Germany. Since its establishment as the U.S. subsidiary of its German parent 55 years ago, Carl Zeiss, Inc. has constantly expanded its presence in the American market as a sales, marketing and service organization of precision optical products for the scientific community, for industry and the consumer-products which have consistently set world standards for quality for nearly one and a half centuries. Zeiss technology has always been synonymous with "state of the art," and uncompromising excellence has been applied to such diverse areas as light and electron microscopes, ophthalmic diagnostic instruments, geodetic and photogrammetric instruments, precision machines for industrial measuring, lenses for industrial uses and aerial cameras, telescopes, and planetaria—to name a select few. With offices in principal metropolitan areas throughout the country, the Carl Zeiss, Inc. organization has grown to more than 300 employees nationwide. In addition to the traditional Zeiss offering of scientific, medical, and industrial products, there is a line of binoculars, riflescopes, sunglasses and sporting glasses. The most recent addition to the consumer products line are high fashion eyeglass frames and sunglasses available through professional ophthalmic dispensers.

Along with excellence, pioneering has been another keynote in the history of Zeiss. One area in which this innovative spirit has been applied and in which Zeiss takes particular pride is the field of microsurgery. The surgical precision attainable through Zeiss-developed microsurgical equipment has paved the way for monumental surgical breakthroughs. That which was previously impossible is now, although no less impressive, an everyday occurrence: the reattachment of severed limbs, reversal of vasectomies and tubal ligations, enhanced precision in neurosurgery, brain surgery, and reconstructive surgery, new possibilities in vascular surgery to prevent strokes, in the battle against diabetic blindness and in many other fields. The list goes on and will continue to grow and attest to one in a long series of Zeiss achievements which have improved the quality of life.

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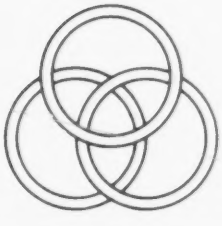

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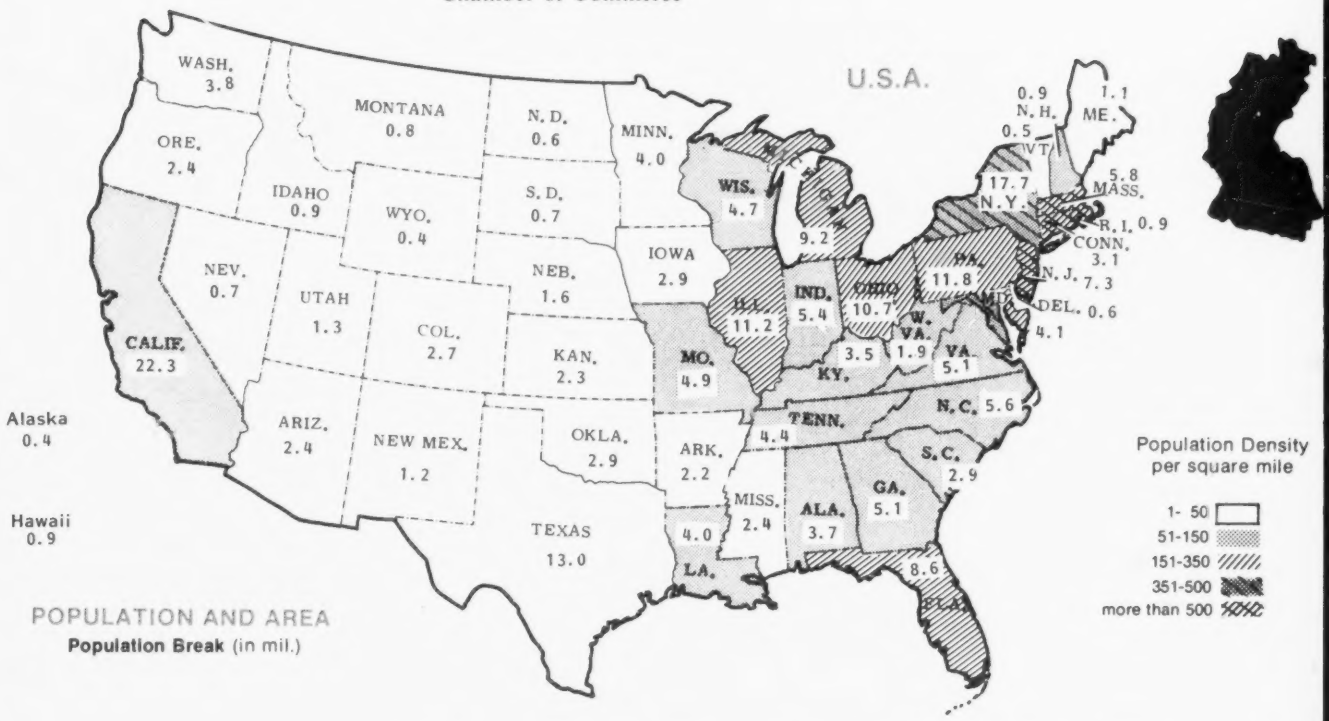


POPULATION AND AREA

Population Break (in mil.)

	1960	1970	1975	1976	1977	1978	1979
Area (in 1000 sq. miles)							3,618.5
Population (in mil.)	180.7	204.9	213.5	215.1	216.8	218.6	220.6
- male	89.3	100.3	104.2	104.9	105.7	106.5	107.5
- female	91.4	104.6	109.3	110.2	117.1	112.1	113.1
By age (in %)							
- under 18	35.4	34.2	30.9	30.2	29.5	29.0	28.4
- between 18-65	55.2	56.0	58.8	59.1	59.9	60.0	60.4
- over 65	9.4	9.8	10.3	10.7	10.6	11.0	11.2
Households (in mil.)	58.2	63.4	71.1	72.9	74.1	76.0	77.3

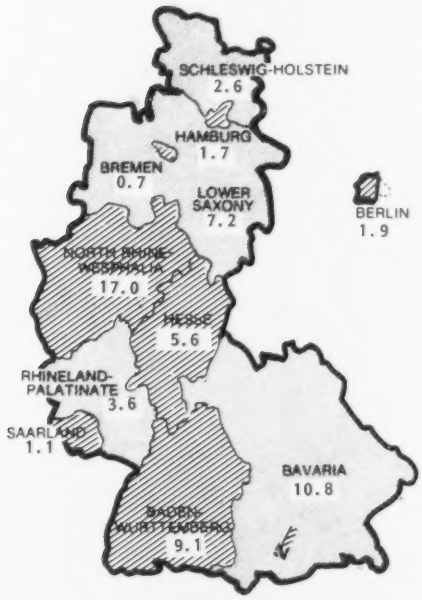
Source: U.S. Department of Commerce

Labor Market (in 1000)

Period	Civilian Labor Force	Employment					Unemployment	
		Total	Manu-facturing	Agric.	Gov.	Other	Unemployed	%
1960	69,628	65,778	16,696	5,458	8,358	35,266	3,852	5.5
1970	82,715	78,627	19,349	3,462	12,561	43,255	4,088	4.9
1971	84,113	79,120	18,572	3,387	12,887	44,274	4,998	5.9
1972	86,542	81,702	19,090	3,472	13,340	45,800	4,840	5.6
1973	88,714	84,409	20,054	3,452	13,742	47,161	4,304	4.9
1974	91,011	85,936	20,016	3,492	14,285	48,143	5,076	5.6
1975	92,613	84,783	18,347	3,380	14,720	48,336	7,830	8.5
1976	94,773	87,485	18,997	3,297	14,971	50,220	7,288	7.7
1977	97,401	90,546	19,647	3,244	15,079	52,576	6,855	7.0
1978	100,420	94,373	20,332	3,342	15,476	55,223	6,047	6.0
1979	102,908	96,945	20,979	3,297	15,613	57,056	5,963	5.8
1980, June	104,542	96,537	19,999	3,191	16,225	57,122	8,006	7.7

Source: U.S. Department of Labor
Council of Economic Advisors

GERMANY



POPULATION AND AREA
Population Break (in mil.)

Population Density
per square mile

351-500
more than 500

	1960	1970	1975	1976	1977	1978	1979
Area (in 1000 sq. miles)							96.0
Population (in mil.)	55.4	60.7	61.8	61.5	61.4	61.3	61.4
- male	26.0	28.9	29.4	29.3	29.2	29.2	29.3
- female	29.4	31.8	32.3	32.2	32.2	32.1	32.1
By age (in %)							
- under 18	25.3	27.1	25.8	25.4	24.8	24.3	-
- between 18-65	63.8	59.7	59.6	59.7	60.0	60.3	-
- over 65	10.9	13.2	14.6	14.9	15.2	15.4	-
Households (in mil.)	19.3	22.0	23.7	23.9	24.2	24.2	24.5

Source: Statistisches Bundesamt, Germany

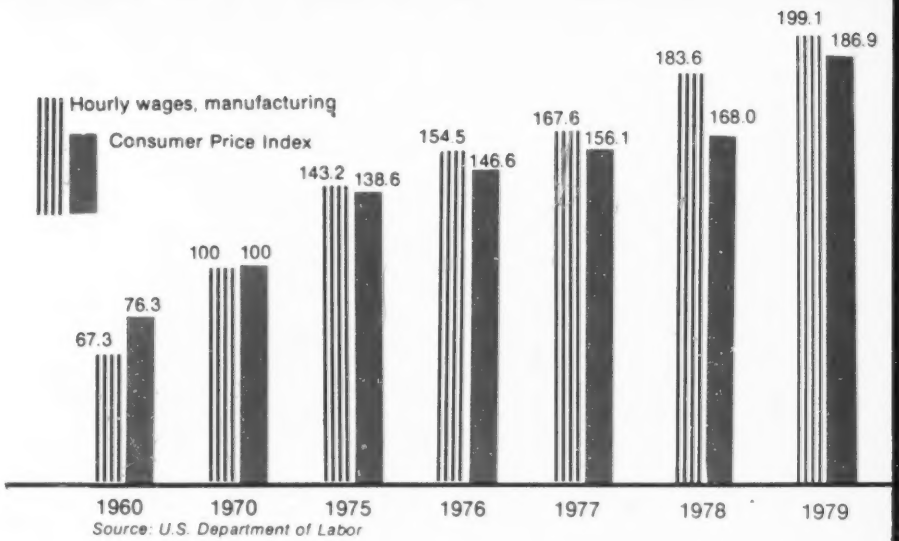
Labor Market (in 1000)

Period	Civilian Labor Force	Employment					Unemployment	
		Total	Manu-facturing	Agric.	Gov.	Other	Unemployed	%
1960	26,516	26,247	12,518	3,623	2,434	7,672	271	1.3
1970	26,817	26,668	13,024	2,262	3,077	8,305	149	0.7
1971	26,910	26,725	12,989	2,144	3,198	8,394	185	0.9
1972	26,901	26,655	12,815	2,038	3,296	8,506	246	1.1
1973	26,985	26,712	12,830	1,954	3,376	8,552	273	1.3
1974	26,797	26,215	12,398	1,882	3,421	8,514	582	2.6
1975	26,397	25,323	11,615	1,823	3,509	8,376	1,074	4.7
1976	26,136	25,088	11,379	1,743	3,505	8,461	1,060	4.6
1977	26,074	25,044	11,330	1,656	3,477	8,581	1,030	4.5
1978	26,223	25,230	11,359	1,608	3,531	8,732	993	4.3
1979	26,424	25,548	11,482	1,544	3,602	8,920	876	3.8
1980, June	-	-	-	-	-	-	781	3.4

Source: Statistisches Bundesamt, Germany

U.S.A.
WAGES AND PRICES

Wages and inflation (1970=100)



Source: U.S. Department of Labor

Gross Hourly Earnings (in $)

Period	Manu-facturing	% chg. from year earlier	Primary Metal Indus.	Chem.	Mech. engin.	El. engin.	Transp. equip.	Apparel
1960	2.26	+3.2	2.81	2.50	2.55	2.28	2.74	1.59
1970	3.35	+5.1	3.93	3.69	3.77	3.28	4.05	2.39
1975	4.83	+9.3	6.17	5.37	5.36	4.58	6.02	3.19
1976	5.22	+8.1	6.80	5.89	5.76	4.91	6.54	3.41
1977	5.68	+8.8	7.40	6.43	6.25	5.39	7.28	3.62
1978	6.17	+8.6	8.20	7.01	6.77	5.82	7.91	3.94
1979	6.69	+8.4	8.98	7.59	7.33	6.31	8.52	4.24
1980, June	7.22	+8.1	9.68	8.22	7.98	6.86	9.25	4.51

Source: U.S. Department of Labor

Consumer Price Index (1967 = 100)

Period	All items	% chg. from year earlier	Housing (Rent)	Food	Util.	Apparel	Transp.	Health care	Enter-tainment
1960	88.7	+ 1.6	91.7	88.0	95.9	89.6	89.6	79.1	-
1970	116.3	+ 5.9	110.1	114.9	107.6	116.1	112.7	120.6	116.7
1975	161.2	+ 9.1	137.3	175.4	167.8	142.3	150.6	168.6	152.2
1976	170.5	+ 5.8	144.7	180.8	182.7	147.6	165.5	184.7	159.8
1977	181.5	+ 6.5	153.5	192.2	202.2	154.2	177.2	202.4	167.7
1978	195.4	+ 7.7	164.0	211.4	216.0	159.6	185.5	219.4	176.2
1979	217.4	+11.3	176.0	234.5	239.3	166.6	212.0	239.7	187.6
1980, June	247.6	+14.3	191.1	252.0	282.2	177.2	249.7	264.7	205.3

Source: U.S. Department of Labor

Producer Price Index (1967 = 100)

Period	All commod.	% chg. from year earlier	Farm products	All ind. commods.	Iron & steel	Chems.	Machs. nonel.	Processed foods
1960	94.9	+ 0.1	97.2	95.3	97.1	101.8	-	89.5
1970	110.4	+ 3.7	111.0	110.0	115.1	102.2	-	112.0
1975	174.9	+ 9.2	186.7	171.5	200.9	181.3	173.3	182.6
1976	183.0	+ 4.6	191.1	182.4	215.8	187.0	185.0	178.0
1977	194.2	+ 6.1	192.5	195.1	230.3	192.7	197.7	186.1
1978	209.3	+ 7.8	212.5	209.4	253.6	198.8	214.3	202.6
1979	235.6	+12.6	241.4	236.5	283.5	222.3	234.2	222.5
1980, June	265.2	+13.6	233.4	273.0	303.1	261.7	260.8	233.8

Source: U.S. Department of Labor

GERMANY

WAGES AND PRICES

Source: Statistisches Bundesamt, Germany

Gross Hourly Earnings (in DM)

Period	Manu-facturing	% chg. from year earlier	Iron & Steel	Chem.	Mech. engin.	El engin.	Road Motor Vehicles	Apparel
1960	2.69	+10.2	3.30	2.70	2.78	2.42	3.02	1.94
1970	6.09	+13.4	6.83	6.51	6.32	5.48	6.84	4.54
1975	9.85	+ 7.9	10.47	10.51	10.39	9.06	11.28	7.38
1976	10.49	+ 6.5	11.14	11.32	10.98	9.61	12.02	7.83
1977	11.27	+ 7.4	11.92	12.21	11.83	10.38	12.96	8.40
1978	11.88	+ 5.4	12.47	12.85	12.38	10.89	13.65	8.88
1979	12.55	+ 5.6	13.23	13.42	13.07	11.50	14.29	9.28
1980, April	13.30	+ 6.7	-	-	-	-	-	-

Source: Statistisches Bundesamt, Germany

Consumer Price Index (1976=100)

Period	All items	% chg. from yr. earlier	Housing (rent)	Food	Util.	Apparel	Transp.	Health care	Enter-tainment
1960	55.2	+1.4	38.9	59.3	42.3	58.3	54.2	45.0	52.6
1970	71.2	+3.3	71.4	73.1	56.7	71.0	66.6	67.5	73.6
1975	95.9	+6.0	95.1	95.1	93.8	96.7	95.5	95.4	96.3
1976	100	+4.3	100	100	100	100	100	100	100
1977	103.7	+3.7	103.4	104.9	100.9	104.8	102.1	103.9	101.7
1978	106.5	+2.7	106.4	106.4	103.3	109.4	105.1	108.0	103.4
1979	110.9	+4.1	109.8	108.2	124.8	114.2	110.0	112.6	106.1
1980, June	117.4	+6.0	115.3	113.5	138.0	120.5	117.9	118.9	108.9

Source: Statistisches Bundesamt, Germany

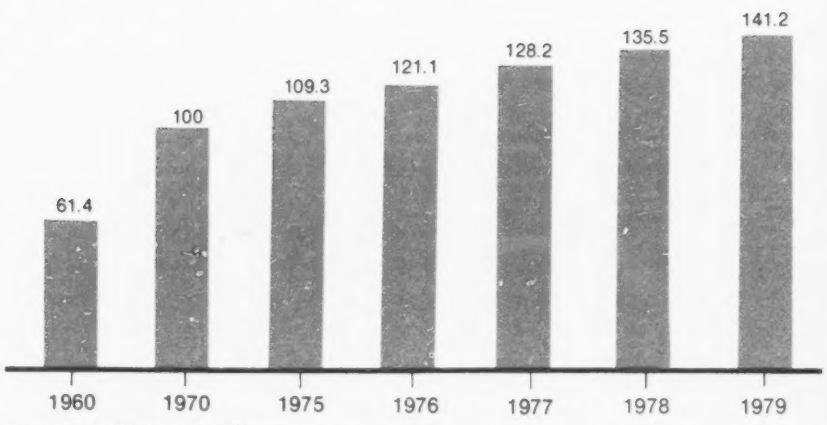
Producer Price Index (1976=100)

Period	All commod.*	% chg. from yr. earlier	Farm products	All ind. commods.	Iron & steel	Chems.	Machs. nonel.	Processed foods
1960	64.8	-	60.5	62.3	73.4	70.5	50.2	69.8
1970	69.3	+ 5.6	67.1	71.0	72.0	74.9	66.4	75.4
1975	94.5	+ 3.4	89.4	96.4	99.0	98.8	95.1	96.1
1976	100	+ 5.8	100	100	100	100	100	100
1977	101.8	+ 1.8	95.5	102.7	96.0	99.1	105.0	105.7
1978	101.0	- 0.3	91.9	103.9	96.1	97.4	108.7	104.8
1979	108.0	+ 6.9	93.8	108.9	99.0	105.5	112.8	105.0
1980, June	117.3	+ 8.1	94.4	117.2	102.8	115.0	119.0	107.3

**Wholesale price index*

Source: Statistisches Bundesamt, Germany

INDUSTRIAL PRODUCTION



Source: U.S. Department of Commerce

Value of Shipments by Industry (in mil. $)

Period	All industries	Iron & steel	Nonferr. metals	Machs. nonel.	Machs. elec.	Motor-vehicles	Chemicals	Textiles
1960	364,920	16,080	9,720	33,240	23,400	25,920	27,720	14,520
1970	630,715	25,032	21,423	55,859	48,137	42,537	49,253	22,338
1971	666,959	26,656	21,312	58,830	50,041	54,786	52,170	24,472
1972	744,198	28,109	21,392	61,024	55,950	66,762	57,437	26,726
1973	856,778	35,260	26,539	73,380	63,497	77,278	67,034	30,531
1974	981,985	47,424	33,248	86,572	66,741	72,120	81,377	33,097
1975	992,687	40,353	24,156	89,485	64,388	73,220	85,967	32,941
1976	1,185,716	46,687	30,531	105,529	73,868	95,380	104,142	36,387
1977	1,335,072	51,519	40,877	119,008	85,759	117,758	113,891	40,821
1978	1,496,573	60,533	47,455	137,119	98,661	132,207	126,445	43,951
1979	1,692,001	68,663	54,650	157,695	110,713	129,364	149,481	46,992

Source U.S. Department of Commerce

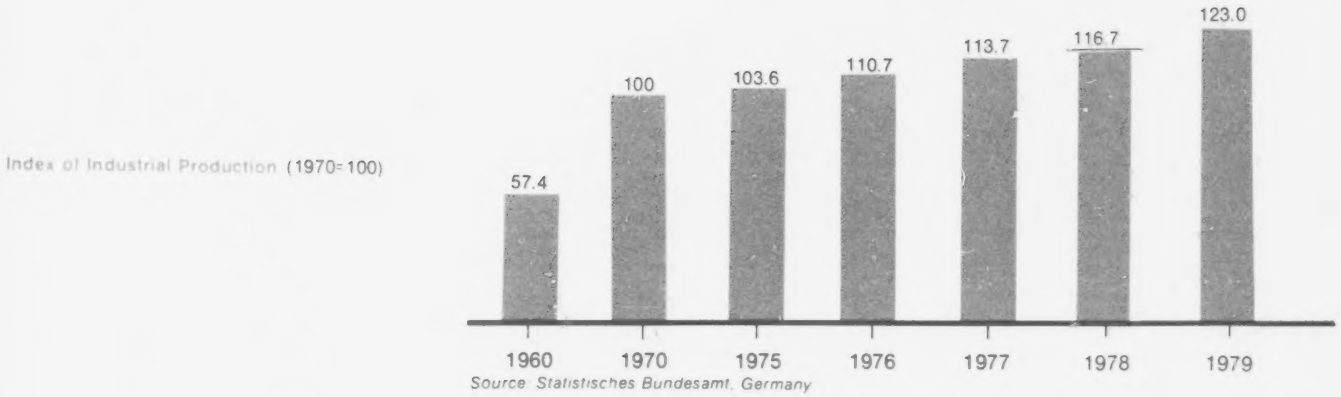
Production of Selected Commodities

Period	Coal	Steel	Alum.	Cement	Sulfuric acid	Plastics	Elec. energy (in bil. kWh)	Cars (in 1000 units)
	(in mil. short tons)							
1960	435	99.3	2.344	62.8	17.9	3.1	841.6	6,675
1970	613	131.5	4.757	76.1	29.5	9.4	1,639.8	6,547
1971	561	120.4	4.739	80.3	29.0	10.5	1,717.5	8,585
1972	602	133.2	5.067	84.6	31.4	12.9	1,853.4	8,824
1973	599	150.8	5.567	87.5	31.5	15.1	1,947.1	9,658
1974	610	145.7	6.093	82.9	34.2	15.2	1,967.6	7,331
1975	654	116.6	5.035	69.7	32.4	12.4	2,001.0	6,713
1976	685	127.9	5.597	74.5	33.5	14.8	2,036.5	8,498
1977	698	125.3	6.130	78.7	35.8	17.3	2,124.1	9,201
1978	671	137.0	6.211	84.8	41.1	19.4	2,203.9	9,165
1979	776	136.0	6.499	84.9	42.0	21.0	2,247.2	8,419

Source U.S. Department of Commerce

GERMANY

INDUSTRIAL PRODUCTION



Source: Statistisches Bundesamt, Germany

Value of Shipments by Industry (in mil. DM)

Period	All industries	Iron & steel	Nonferr. metals	Machs. nonel.	Machs. elec.	Motor-vehicles	Chemicals	Textiles
1960	266,373	20,107	4,564	24,475	19,353	16,577	22,360	16,482
1970	528,867	30,563	9,515	56,398	50,873	42,013	50,527	24,350
1971	563,033	27,506	8,736	61,092	54,578	46,161	53,576	26,054
1972	596,014	28,179	9,194	62,968	60,299	48,037	56,738	26,476
1973	743,232	38,195	13,738	75,175	72,799	69,185	75,042	28,789
1974	836,052	50,438	16,513	83,030	79,584	67,705	100,169	29,986
1975	819,312	42,842	13,766	92,562	78,318	77,533	90,451	28,159
1976	916,950	43,493	16,084	96,155	85,716	94,902	104,084	30,754
1977	963,132	40,056	16,238	101,514	92,101	105,738	108,539	31,268
1978	999,924	40,433	16,614	105,262	96,716	114,817	110,611	31,043
1979	1,105,356	45,670	21,284	111,389	104,054	124,634	126,007	32,315

Source: Statistisches Bundesamt, Germany

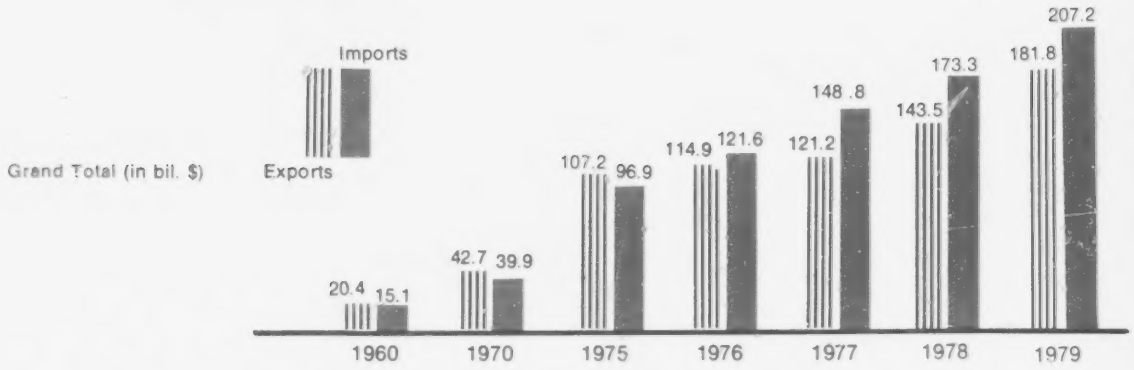
Production of Selected Commodities

Period	Coal	Steel	Alum.	Cement	Sulfuric acid	Plastics	Elec. energy (in bil. kWh)	Cars (in 1000 units)
			(in mil. metric tons)					
1960	142.3	33.4	0.169	24.9	2.6	1.0	116.4	1,817
1970	111.3	44.3	0.309	38.3	3.6	4.4	242.8	3,529
1971	110.8	39.7	0.428	41.0	3.6	4.8	259.6	3,692
1972	102.5	43.2	0.445	43.1	3.9	5.5	274.8	3,513
1973	97.3	48.9	0.533	41.0	4.1	6.5	299.0	3,643
1974	94.9	52.6	0.689	36.0	4.2	6.3	311.7	2,840
1975	92.4	39.7	0.678	33.5	3.4	5.1	301.8	2,906
1976	89.3	41.8	0.697	34.2	3.8	6.5	333.6	3,548
1977	84.8	38.5	0.742	32.2	3.8	6.2	335.3	3,796
1978	83.9	40.8	0.740	33.5	3.8	6.7	353.4	3,903
1979	86.3	45.5	0.742	35.5	4.1	7.2	372.8	3,942

Source: U.S. Department of Commerce

U.S.A.

FOREIGN TRADE



Source: U.S. Department of Commerce

By Commodity Groups (in mil. $)

Imports				Exports		
1977	1978	1979	Commodity group	1977	1978	1979
12,558	13,521	15,171	Food and live animals	14,136	18,333	22,245
1,669	2,221	2,566	Beverages and tobacco	1,847	2,293	2,337
8,486	9,334	10,650	Crude materials, inedible	13,890	15,553	20,755
44,537	42,105	60,061	Mineral fuels and lubricants	4,183	3,878	5,616
531	511	740	Oils and fats	1,309	1,521	1,845
4,970	6,427	7,485	Chemicals	10,823	12,618	17,306
21,367	27,237	30,065	Manufactured goods by chief material	10,850	12,466	16,236
36,407	47,626	53,678	Machinery and transport equipment	50,257	59,270	70,491
13,809	19,062	21,006	Miscellaneous manufactured articles	8,236	10,191	12,643
3,981	4,018	4,905	Items not classified by kind	4,314	5,030	9,103
148,808	173,272	207,198	Total	121,216	143,460	181,829

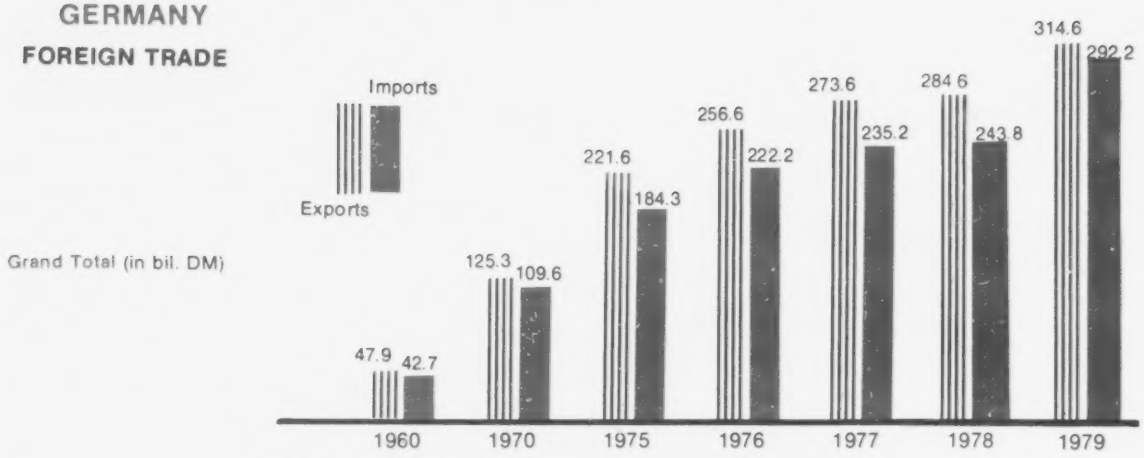
Source: U.S. Department of Commerce

Major Partners (in %)	1977	1978	1979
IMPORTS:			
1. Canada	20.2	19.1	18.3
2. Japan	12.7	14.4	12.7
3. Germany	5.0	5.8	5.4
4. Mexico	3.2	3.5	4.3
5. Nigeria	4.1	2.7	3.9
EXPORTS:			
1. Canada	21.3	19.7	18.2
2. Japan	8.7	9.0	9.7
3. United Kingdom	4.9	5.0	5.8
4. Mexico	4.0	4.7	5.4
5. Germany	5.0	4.9	4.7

Source: U.S. Department of Commerce

GERMANY

FOREIGN TRADE



Source: Statistisches Bundesamt, Germany

By Commodity Groups (in mil. DM)

Imports				Exports		
1977	1978	1979	Commodity group	1977	1978	1979
30,408	29,995	30,650	Food and live animals	10,774	11,006	12,590
2,589	2,859	3,091	Beverages and tobacco	1,383	1,417	1,620
21,049	19,691	23,091	Crude materials, inedible	5,442	5,400	6,565
39,919	39,342	56,729	Mineral fuels and lubricants	7,219	9,123	10,613
1,333	1,259	1,531	Oils and fats	1,469	1,366	1,504
17,396	17,582	22,697	Chemicals	32,998	33,725	41,043
43,584	46,024	54,151	Manufactured goods by chief material	53,178	57,258	64,109
45,001	50,219	56,372	Machinery and transport equipment	130,886	132,754	141,087
27,100	29,678	34,079	Miscellaneous manufactured articles	24,768	26,688	29,325
6,799	7,234	9,769	Items not classified by kind	5,497	5,836	6,164
235,178	243,844	292,161	Total	273,614	284,573	314,621

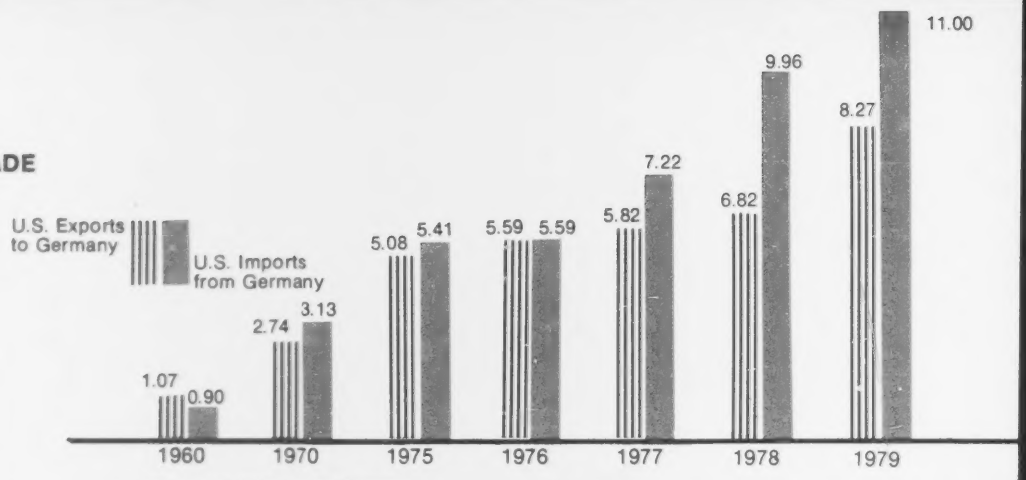
Source: Statistisches Bundesamt, German,

Major P[illegible] - %)	1977	1978	1979
IMPORTS:			
1. Netherlands	13.1	12.6	12.3
2. France	11.6	11.6	11.4
3. Italy	8.8	9.5	8.8
4. Belgium-Luxembourg	8.3	8.4	8.0
5. United States	7.2	7.2	6.9
EXPORTS:			
1. France	12.3	12.3	12.7
2. Netherlands	10.1	10.0	9.9
3. Belgium-Luxembourg	7.9	8.3	8.5
4. Italy	6.8	6.8	7.8
5. United Kingdom	5.3	5.9	6.7

Source: Statistisches Bundesamt, Germany

U.S.A.

U.S.—GERMAN TRADE



Source: U.S. Department of Commerce

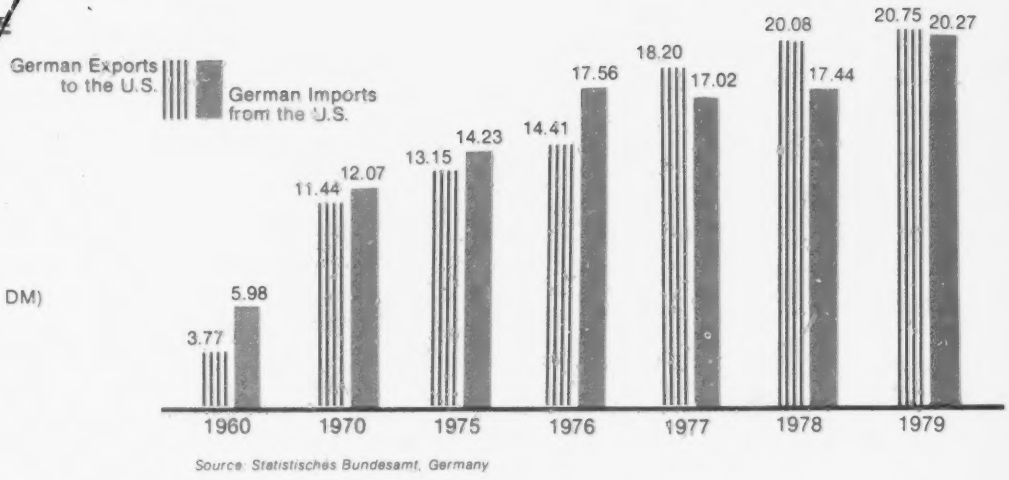
Major Items of U.S.-German Trade (in mil. $)

U.S. Exports to Germany				U.S. Imports from Germany		
1977	1978	1979		1977	1978	1979
5,823 7,338*	6,815 8,724*	8,272 11,080*	Total	7,215 7,868*	9.961 10,087*	10,995 11,332*
944.9	835.7	746.1	Food and live animals	73.2	135.9	121.9
22.1	21.1	23.8	Meat and prep.	2.1	3.2	1.5
1.6	3.1	3.9	Dairy products and eggs	3.9	5.3	6.0
13.6	20.5	26.6	Fish and prep.	3.2	3.1	1.9
399.8	281.1	198.6	Cereals and prep.	3.7	5.2	5.3
118.9	147.4	171.0	Fruits and vegetables	10.6	13.3	19.1
353.3	341.9	300.5	Animal feeding-stuffs	5.3	8.2	7.6
26.6	3.1	2.0	Coffee, cocoa, spices and prep.	32.4	77.6	43.1
151.7	117.6	149.5	Beverages and tobacco	92.9	136.3	135.5
-	-	-	Beer	24.3	31.5	39.3
-	-	0.1	Wine	66.6	100.7	91.2
7.6	9.5	9.3	Alcoholic beverages, distilled	1.0	2.0	1.7
144.0	108.0	140.0	Tobacco, raw and manufactured	0.7	1.4	1.5
912.6	939.4	1,225.2	Crude materials, inedible, exc. fuel	52.8	63.2	90.9
59.7	57.8	90.5	Hides, skins and furskins undressed	2.3	2.7	4.7
415.4	380.4	346.0	Soybeans	-	-	-
25.3	28.3	51.3	Rubber, incl. synthetic and reclaimed	4.9	2.2	2.2
74.5	102.7	133.5	Wood, lumber and cork	0.4	0.6	0.6
100.0	97.8	140.8	Pulps and waste paper	-	-	-
24.8	39.1	65.4	Raw textile fibers and their waste	7.1	11.9	10.3
63.9	65.0	74.0	Crude fertilizers and minerals	5.1	6.7	9.6
78.4	67.2	196.5	Metalliferous ores and metal scrap	15.6	22.5	52.9
21.8	24.6	60.6	Nonferrous metal scrap	12.2	14.3	36.8
13.1	16.1	17.9	Vegetable materials, crude	3.1	2.8	3.0
90.7	88.0	195.0	Mineral fuels and lubricants	127.8	325.1	224.4
43.5	37.2	134.0	Coal, coke and briquets	113.4	301.4	201.0
47.2	50.7	60.9	Petroleum and petroleum products	14.3	23.7	23.3
45.6	43.3	31.6	Oils and fats, animal and vegetable	2.7	2.7	1.3
35.0	40.8	30.3	Animal oils and fats	0.2	0.4	0.2
7.8	2.4	1.0	Vegetable oils and fats	1.7	1.0	-
450.5	572.6	765.8	Chemicals	597.9	795.4	914.5
230.0	309.4	449.0	Organic and inorganic chemicals	305.2	367.8	445.4
14.9	14.9	16.5	Essent. oils, perfume materials, soaps	13.8	21.3	28.5
15.4	17.5	20.4	Dyeing, tanning and coloring materials	64.3	81.1	92.4
96.6	181.5	258.8	Radioactive materials	0.1	2.6	0.7
60.9	82.5	95.2	Medicinal and pharmaceutical products	46.0	66.0	78.2
74.5	79.1	117.6	Synthetic resins and plastic materials	87.2	142.8	165.5
33.6	37.1	56.4	Other chemical products	62.1	109.3	100.5

continued

GERMANY

GERMAN-U.S. TRADE



Source: Statistisches Bundesamt, Germany

Major Items of U.S.-German Trade (in mil. $) (continued)

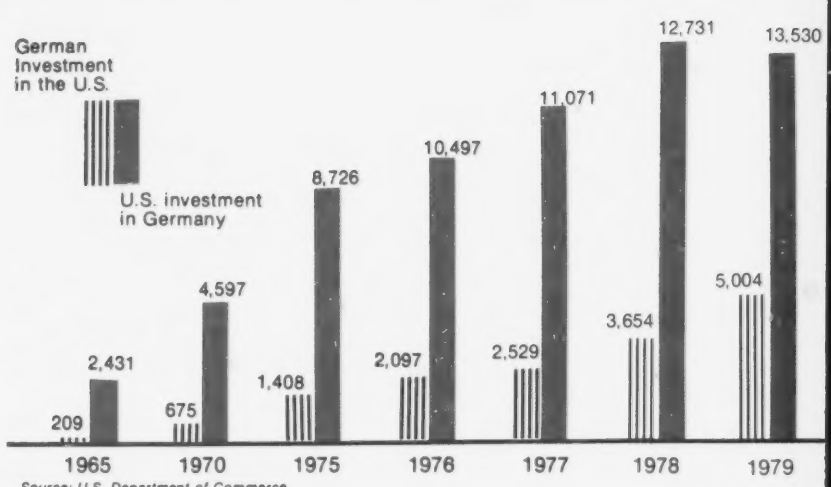
U.S. Exports to Germany				U.S. Imports from Germany		
1977	1978	1979		1977	1978	1979
480.0	580.0	680.0	Manufactured goods by chief material	1,195.3	1,579.8	1,606.8
11.2	12.2	17.2	Leather	9.4	14.1	18.3
3.5	4.8	7.7	Tires and tubes for tires	61.9	61.1	91.6
68.4	90.8	130.3	Textile yarn and fabrics	88.0	90.6	86.0
32.8	48.2	60.7	Wood and cork	6.7	5.8	7.0
73.0	79.3	105.3	Paper and paperboard	27.7	41.6	25.1
15.7	19.0	25.8	Iron and steel	540.6	716.0	690.6
133.7	86.6	117.0	Nonferrous metals	151.4	211.5	205.4
67.3	108.0	141.7	Metal manufactures	166.3	236.6	260.4
30.1	28.6	30.4	Glass	28.8	47.1	41.8
7.6	9.6	10.3	Glassware	25.5	39.4	40.5
0.2	1.0	1.7	Pottery	34.8	54.5	70.5
2,030.5	2,645.4	3,275.7	Machinery and transport equipment	4,405.2	5,985.4	6,849.1
999.0	1,326.4	1,658.9	Machines, exc. electrical	1,529.0	2,262.4	2,600.2
582.2	583.3	759.1	Electrical machines and apparatus	385.7	435.0	541.9
448.4	735.7	857.7	Transport equipment	2,490.5	3,288.0	3,707.0
27.4	51.5	56.8	--Metalworking machinery	101.0	213.6	277.4
384.5	605.5	830.3	--Office machines	145.3	216.1	213.5
27.9	40.5	51.0	--Agricultural machines	96.3	112.6	185.4
29.4	28.6	38.2	--Textile and leather machinery	168.5	256.9	242.5
89.8	167.5	213.8	--Other machines for spec. industries	240.4	515.7	574.4
303.8	242.9	288.5	--Other machinery	532.4	485.7	574.9
101.9	152.9	172.6	--Telecommunications apparatus	32.7	70.7	74.3
31.0	54.6	81.3	--Elec. medical and radiolog. apparatus	67.8	86.2	88.4
158.1	222.1	323.6	--Road motor vehicles and parts	2,444.2	3,250.7	3,662.9
280.2	513.5	511.3	--Aircraft and spacecraft and parts	29.8	25.7	25.7
559.5	696.5	962.1	Miscellaneous manufactured articles	533.5	745.0	783.6
37.8	32.0	50.0	Clothing and accessories	26.4	32.2	30.4
0.9	1.8	3.2	Footwear	19.2	23.0	13.4
230.0	290.7	364.3	Professional, scientific + controlling instruments	175.8	196.2	237.5
88.0	153.1	176.8	Photo and motion picture supplies	35.7	77.5	61.7
9.9	4.9	4.3	Watches and clocks	41.6	53.3	53.3
44.8	31.6	54.6	Sound recorders, musical instruments	41.1	33.2	39.6
13.9	16.0	22.4	Printed matter	25.7	41.7	33.8
24.9	30.1	41.5	Rubber and plastic manufactures	54.1	87.0	97.5
47.3	66.7	98.2	Toys, sporting goods, baby carriages	24.2	31.1	34.1
21.2	24.0	80.2	Artworks, collectors pieces, antiques	23.1	28.1	32.0
4.8	7.7	9.7	Jewelry	15.0	21.2	23.8
32.4	278.5	158.9	Items not classified by kind	134.1	191.9	227.4

Source: U.S. Department of Commerce

* Statistisches Bundesamt, Germany

U.S.A.

DIRECT INVESTMENT



Source: U.S. Department of Commerce

U.S. Direct Investment Abroad (in mil. $)
(cumulative, book value at year end)

	1976	1977	1978	1979
Total:	136,809	149,848	167,804	192,648
By country:				
1. Canada	33,932	35,200	37,081	41,033
2. United Kingdom	15,137	17,434	20,416	24,271
3. Germany	10,497	11,071	12,731	13,530
4. Switzerland	5,762	6,101	7,394	8,615
5. Brazil	5,416	5,930	7,175	7,514
6. Other countries	66,065	74,112	83,007	97,685
By industry:				
1. Petroleum	28,408	31,420	33,790	41,553
2. Finance and insurance	16,715	20,327	24,041	27,459
3. Machinery	17,091	18,655	21,123	23,591
4. Trade	13,610	14,744	17,340	20,709
5. Chemicals	12,183	13,466	16,026	18,990
6. Other industries	48,802	51,236	55,484	60,346

Source: U.S. Department of Commerce

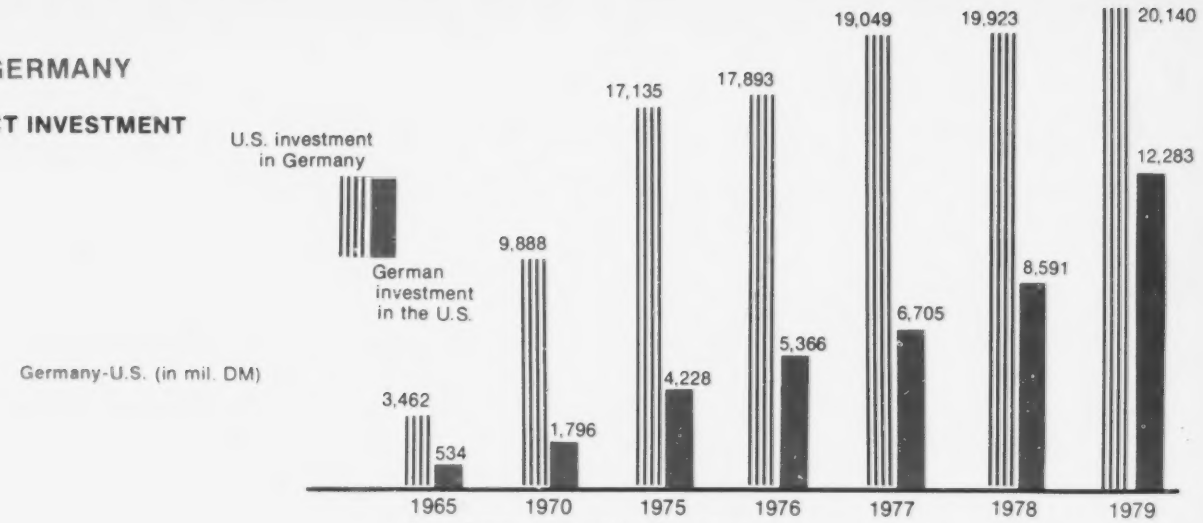
Foreign Direct Investment in the U.S.A. (in mil. $)
(cumulative, book value at year end)

	1976	1977	1978	1979
Total	30,770	34,595	42,471	52,260
By country:				
1. Netherlands	6,255	7,830	10,078	12,462
2. United Kingdom	5,802	6,397	7,638	9,391
3. Canada	5,907	5,650	6,180	6,974
4. Germany	2,097	2,529	3,654	5,004
5. Switzerland	2,295	2,651	2,879	3,290
6. Other countries	8,414	9,538	12,042	15,139
By industry:				
1. Trade	6,123	7,237	9,161	11,167
2. Petroleum	5,921	6,573	7,762	9,903
3. Finance and insurance	3,943	4,544	5,231	7,153
4. Chemicals	4,347	5,092	6,094	7,081
5. Machinery	2,587	2,667	2,858	3,343
6. Other industries	7,849	8,482	11,365	13,611

Source: U.S. Department of Commerce

GERMANY

DIRECT INVESTMENT



Source: Bundesministerium fuer Wirtschaft, Germany

German Direct Investment Abroad (in mil. DM)
(cumulative, book value at year end)

	1976	1977	1978	1979
Total:	47,048	52,142	58,193	66,002
By country:				
1. United States	5,366	6,705	8,591	12,283
2. France	4,675	5,088	5,632	6,354
3. Belgium-Luxembourg	4,697	5,175	5,748	6,247
4. Switzerland	4,581	4,762	5,153	5,290
5. Brazil	3,451	4,039	4,463	4,996
6. Other countries	24,278	26,373	28,606	30,832
By industry:				
1. Chemicals	8,801	9,389	10,056	10,481
2. Finance and insurance	4,585	5,424	6,381	8,063
3. Electrical engineering	4,948	5,618	5,930	6,786
4. Iron and steel	3,859	4,061	4,779	5,643
5. Mechanical engineering	3,769	4,042	4,480	5,027
6. Other industries	21,186	23,608	26,567	30,002

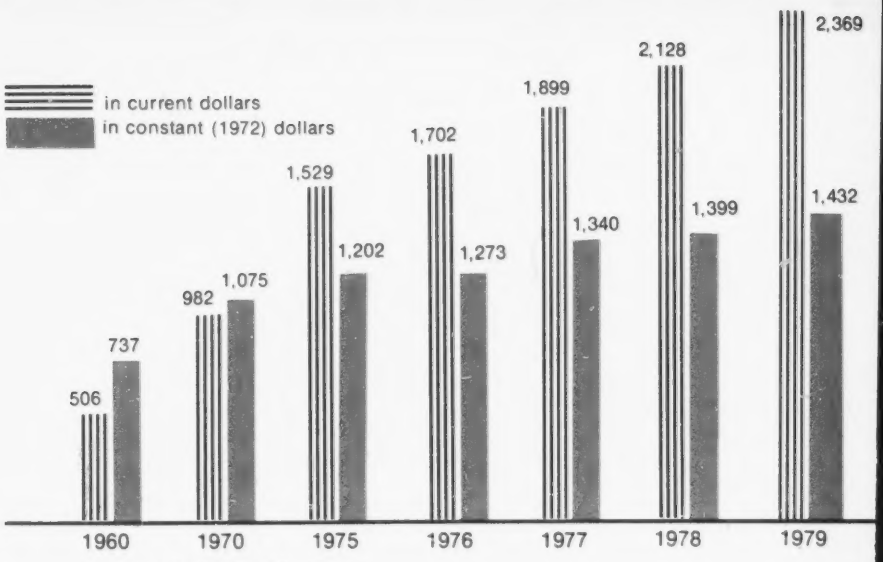
Source: Bundesministerium fuer Wirtschaft, Germany

Foreign Direct Investment in Germany (in mil. DM)
(cumulative, book value at year end)

	1976	1977	1978	1979
Total:	45,518	49,253	53,326	55,242
By country:				
1. United States	17,893	19,049	19,923	20,140
2. Switzerland	7,261	7,962	8,338	8,595
3. Netherlands	5,848	6,316	6,308	6,666
4. United Kingdom	4,409	4,771	5,492	5,855
5. France	2,578	2,884	3,158	3,245
6. Other countries	7,529	8,271	10,107	10,741
By industry:				
1. Holding companies	4,935	5,214	6,569	6,870
2. Petroleum	5,954	6,328	6,636	6,377
3. Finance and insurance	3,503	4,573	4,840	5,235
4. Electrical engineering	4,073	4,405	4,651	5,121
5. Mechanical engineering	4,106	4,429	4,588	4,665
6. Other industries	22,947	24,100	26,042	26,974

Source: Bundesministerium fuer Wirtschaft, Germany

U.S.A.
GROSS NATIONAL PRODUCT
(in bil. $)



Source: U.S. Department of Commerce

GNP by Type of Expenditure
(at current prices)

Period	Gross National Product	% chg. from yr. earlier	Personal Consumption	Government Consumption	Gross Private Domestic Investment	Net Exports of Goods and Services
1960	506.0	+ 4.9	324.9	100.2	76.4	4.4
1970	982.4	+ 5.0	618.8	218.9	140.8	
1971	1,063.4	+ 8.2	668.2	233.7	160.0	1.6
1972	1,171.1	+10.1	733.0	253.1	188.3	- 3.3
1973	1,306.6	+11.6	809.9	269.5	220.0	7.1
1974	1,412.9	+ 8.1	889.6	302.7	214.6	6.0
1975	1,528.8	+ 8.2	979.1	338.4	190.9	20.4
1976	1,702.2	+11.3	1,089.9	361.3	243.0	8.0
1977	1,899.5	+11.6	1,210.0	396.2	303.3	- 9.9
1978	2,127.6	+12.0	1,350.8	435.6	351.5	-10.3
1979	2,368.8	+11.3	1,509.8	476.4	387.2	- 4.6

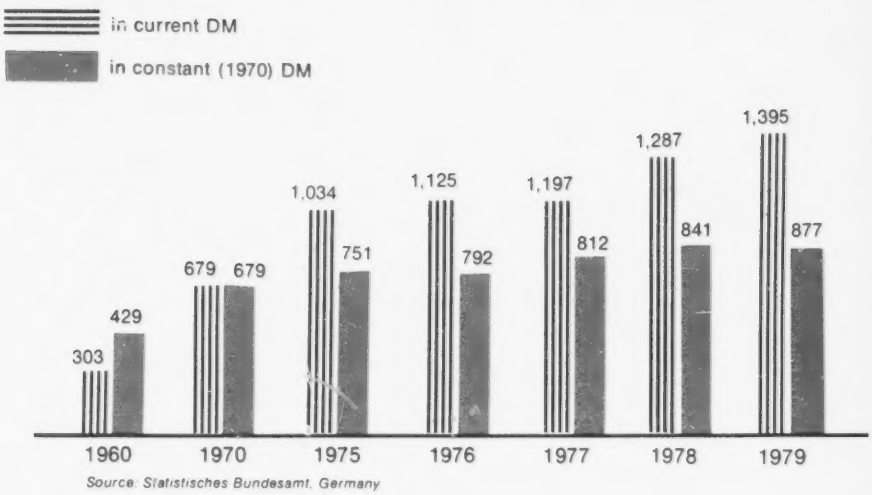
Source: U.S. Department of Commerce

GNP by Type of Expenditure
(at constant 1972 prices)

Period	Gross National Product	% chg. from yr. earlier	Personal Consumption	Government Consumption	Gross Private Domestic Investment	Net Exports of Goods and Services
1960	736.8	+2.3	453.0	172.9	105.4	5.5
1970	1,075.3	-0.3	668.9	250.2	154.7	1.4
1971	1,107.5	+3.0	691.9	249.4	166.8	- 0.6
1972	1,171.1	+5.7	733.0	253.1	188.3	- 3.3
1973	1,235.0	+5.5	767.7	252.5	207.2	7.6
1974	1,217.8	-1.4	760.7	257.7	183.6	15.9
1975	1,202.3	-1.3	774.6	262.6	142.6	22.6
1976	1,273.0	+5.9	820.8	263.3	173.4	15.8
1977	1,340.5	+5.3	861.7	268.5	200.1	10.3
1978	1,399.2	+4.4	900.8	273.2	214.3	11.0
1979	1,431.6	+2.3	924.5	274.3	215.2	17.6

Source: U.S. Department of Commerce

GERMANY
GROSS NATIONAL PRODUCT
(in bil. DM)



Source: Statistisches Bundesamt, Germany

GNP by Type of Expenditure
(at current prices)

Period	Gross National Product	% chg. from yr. earlier	Personal Consumption	Government Consumption	Gross Private Domestic Investment	Net Exports of Goods and Services
1960	303.0	+11.7	171.8	40.7	82.5	7.9
1970	679.0	+13.6	367.5	108.1	189.1	14.2
1971	756.0	+11.3	407.8	129.1	203.4	15.5
1972	827.2	+ 9.4	447.7	144.0	216.9	18.5
1973	920.1	+11.2	491.7	166.7	232.6	29.1
1974	986.9	+ 7.3	527.5	194.0	221.9	43.4
1975	1,033.9	+ 4.4	576.5	215.3	214.5	29.8
1976	1,125.0	+ 8.7	623.6	227.2	231.9	28.6
1977	1,193.7	+ 6.4	667.2	239.5	249.1	29.5
1978	1,287.5	+ 7.5	707.9	256.8	276.5	37.0
1979	1,395.0	+ 8.3	757.9	276.6	319.0	12.5

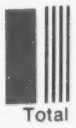
Source: Statistisches Bundesamt, Germany

GNP by Type of Expenditure
(at constant 1970 prices)

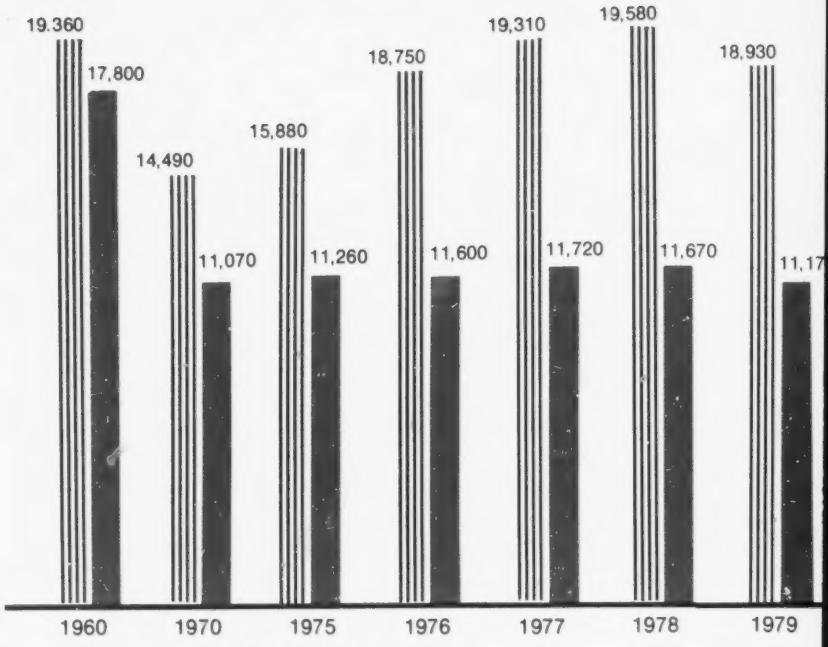
Period	Gross National Product	% chg. from yr. earlier	Personal Consumption	Government Consumption	Gross Private Domestic Investment	Net Exports of Goods and Services
1960	429.5	+9.0	226,4	69.5	118.7	14.9
1970	679.0	+5.9	367.5	108.1	189.1	14.2
1971	701.7	+3.3	386.8	114.9	188.8	11.2
1972	727.3	+3.6	402.2	120.3	193.7	11.1
1973	763.0	+4.9	412.5	126.8	197.8	25.9
1974	765.7	+0.4	413.8	132.3	177.0	42.6
1975	751.5	-2.5	425.9	138.2	165.4	23.8
1976	792.0	+5.3	441.0	141.0	173.2	26.6
1977	812.2	+2.6	454.7	141.8	180.1	27.0
1978	840.8	+3.5	470.4	147.3	191.4	25.2
1979	877.5	+4.4	483.5	151.4	207.7	15.0

Source: Statistisches Bundesamt, Germany

U.S.A.
INTERNATIONAL TRANSACTIONS



Monetary Reserves (in mil. $)



Source: International Monetary Fund

Balance on Current Account (in bil. $)

	1960	1970	1975	1976	1977	1978	1979
Balance on current account	2.8	2.4	18.3	4.4	-14.1	-14.3	- 0.8
Merchandise trade	4.9	2.6	9.0	-9.3	-30.9	-33.8	-29.5
Services	1.2	3.0	13.9	18.7	21.4	24.6	34.3
Transfer payments	-0.6	-1.6	-4.6	-5.0	- 4.6	- 5.1	- 5.6

Source: U.S. Department of Commerce

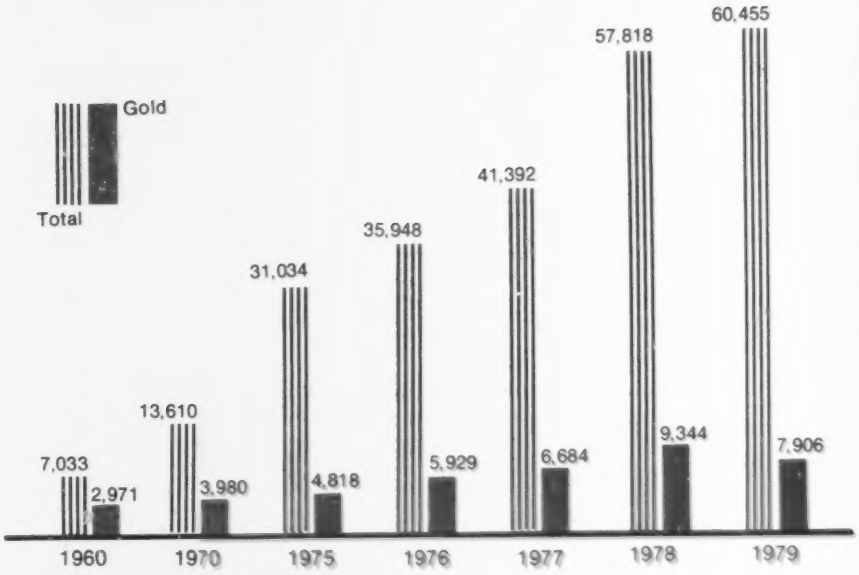
Currency Exchange Rates
(Value of DM 1.00 in $)

Period	Official parity	Exchange rate average
1960	0.2381	-
1970	0.2732	-
1971	0.2732 (floating May-Dec. 1971)	0.2874
1972	0.3103	0.3136
1973	0.3448 (floating from March 19, 1973)	0.3761
1974	-	0.3861
1975	-	0.4060
1976	-	0.3974
1977	-	0.4308
1978	-	0.4987
1979	-	0.5456
1980, Jan.	-	0.5799
Feb.	-	0.5720
March	-	0.5404
Apr.	-	0.5331
May	-	0.5583
June	-	0.5658

Source: Federal Reserve System
International Monetary Fund

GERMANY
INTERNATIONAL TRANSACTIONS

Monetary Reserves (in mil. $)



Source: International Monetary Fund

Balance on Current Account (in bil. DM)

	1960	1970	1975	1976	1977	1978	1979
Balance on current account	4.8	3.2	9.9	9.7	9.8	17.5	-10.1
Merchandise trade	5.2	15.7	37.3	34.5	28.4	41.2	22.4
Services	3.2	-1.1	- 8.3	- 6.6	-10.7	- 8.1	-12.4
Transfer payments	-3.5	-9.8	-17.9	-18.1	-17.9	-17.6	-20.8

Source: Deutsche Bundesbank

Currency Exchange Rates
(Value of $1.00 in DM)

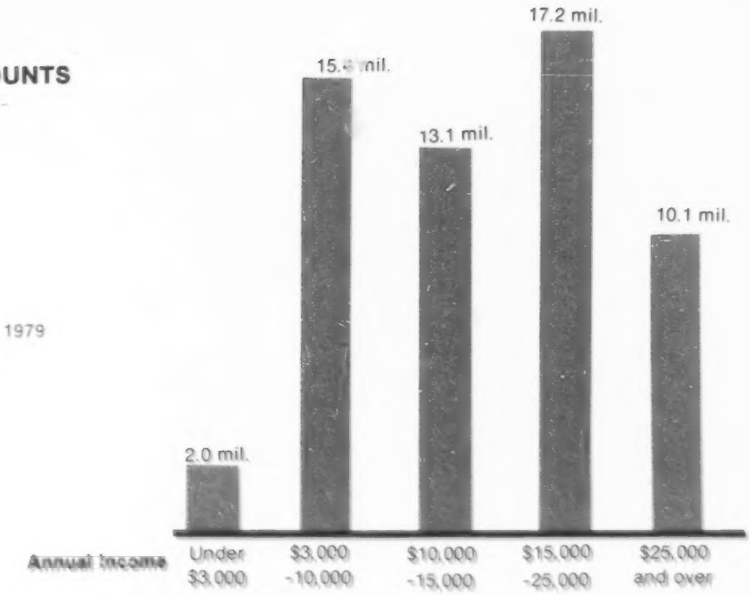
Period	Official parity		Exchange rate average
1960	4.2000		
1970	3.6600		
1971	3.6600	(floating May-Dec	3.9795
1972	3.2225		3.1960
1973	2.9003	(floating from Ma	2.6590
1974	-		2.5867
1975	-		2.4631
1976	-		2.5173
1977	-		2.3217
1978	-		2.0084
1979	-		1.8330
1980, Jan.	-		1.7236
Feb.	-		1.7472
March	-		1.8408
Apr.	-		1.8728
May	-		1.7917
June	-		1.7671

Source: Deutsche Bundesbank

U.S.A.

HOUSEHOLD AND FAMILY ACCOUNTS

Family income Distribution in 1979
(Families total: 57.8 mil.)



Source: U.S. Department of Commerce

Urban Family Budgets 1979

	Lower budget (retired couple)		Intermediate budget (4 persons)		Higher budget (4 persons)	
	$	%	$	%	$	%
Total	6,023	100	20,517	100	30,317	100
Income taxes	-	-	3,031	14.8	6,357	21.0
Social security taxes	-	-	1,256	6.1	1,413	4.7
Food	1,882	31.2	5,044	24.6	6,360	21.0
Housing	1,996	33.1	4,594	22.4	6,971	23.0
Transportation	420	7.0	1,851	9.0	2,411	8.0
Clothing, personal care	394	6.5	1,668	8.1	2,417	8.0
Health care	837	13.9	1,176	5.7	1,227	4.0
Other costs	494	8.2	1,897	9.2	3,161	10.4

Source: U.S. Department of Labor

Households Owning Selected Durables (in % of total households)

	1976	1977	1978	1979
One or more cars	51.3*	52.4*	53.6*	54.6*
Two or more cars	-	-	-	-
TV set, black & white	99.9	99.9	99.9	99.9
Color TV	77.7	81.3	85.2	89.8
Refrigerator	99.8	99.9	99.7	99.8
Freezer	44.4	44.8	44.9	44.7
Washing machine, automatic	72.5	73.3	75.2	77.3
Telephone	95.0	96.0	96.0	97.0

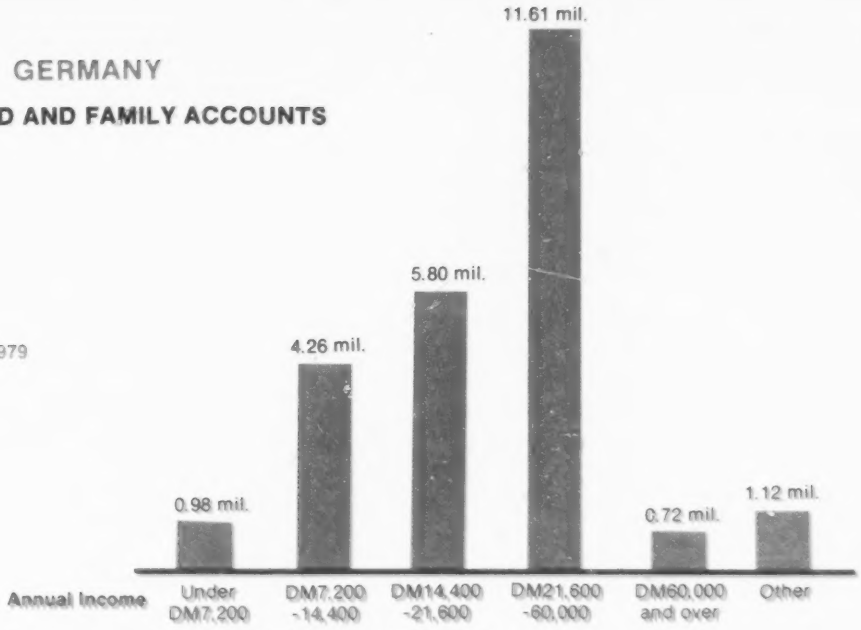
Source: U.S. Department of Commerce, Merchandising, Gralla Publications, Motor Vehicle Manufacturers Association

* Number of cars per 100 population

GERMANY

HOUSEHOLD AND FAMILY ACCOUNTS

Household income Distribution in 1979
(Households, total: 24.5 mil.)



Source: Statistisches Bundesamt, Germany

Urban Family Budgets 1979

	Lower budget (retired couple)		Intermediate budget (4 persons)		Higher budget (4 persons)	
	DM	%	DM	%	DM	%
Total:	13,696	100	39,504	100	62,007	100
Income taxes	–	–	4,403	11.1	10,111	16.3
Social security taxes	–	–	5,213	13.2	3,258	5.3
Food	4,468	32.6	7,806	19.8	9,594	15.4
Housing	5,254	38.4	8,627	21.8	14,108	22.8
Transportation	911	6.7	3,638	9.2	7,349	11.8
Clothing, personal care	825	6.0	2,486	6.3	4,085	6.6
Health care	228	1.7	259	0.7	1,728	2.8
Other costs	2,010	14.7	7,072	17.9	11,805	19.0

Source: Statistisches Bundesamt, Germany

Households Owning Selected Durables (in % of total households)

	1976	1977	1978	1979
One or more cars	76.2	77.7	79.8	81.9
Two or more cars	–	–	–	–
TV set, black & white	76.7	74.8	69.2	58.3
Color TV	42.2	50.1	60.9	69.2
Refrigerator	96.6	96.6	96.4	88.0
Freezer	57.8	61.8	66.3	66.7
Washing machine, automatic	63.2	62.1	65.0	75.6
Telephone	57.3	61.8	69.3	81.2

Source: Statistisches Bundesamt, Germany

Information Sources...

Government

Embassy of the Federal Republic of Germany
4645 Reservoir Road N.W.; Washington, D.C., 20007.

German Information Center
410 Park Avenue, New York, N.Y., 10022.

Embassy of the United States of America
53 Bonn-Bad Godesberg; Mehlemer Aue.

Bundesminister fuer Wirtschaft
53 Bonn-Duisdorf; Villemomblerstr. 76 -Ministry of Economic Affairs.

Bundesminister der Finanzen
53 Bonn 1; Graurheindorferstr. 108 - Ministry of Finance (incl. Department for Customs & Duties).

Presse- und Informationsamt der Bundesregierung
53 Bonn; Welckerstr. 11 - Public Relations Department of the Federal Government.

Statistisches Bundesamt
65 Wiesbaden; Gustav Stresemann Ring 11 - Federal Department of Documentation and Statistics.

Deutsches Patentamt
8 Muenchen 22; Zweibrueckenstr. 12 - Commissioner of Patents.

Bundeskartellamt
1 Berlin 61; Mehringdamm 129 - Federal Antitrust Agency.

Deutsche Bundesbank
6 Frankfurt/Main 50; Wilhelm-Epstein-Strasse 14. - German Federal Reserve Bank.

Public Authorities

Deutscher Normenausschuss
1 Berlin 30; Burggrafenstr. 4-7 - Determination Committee for Industrial Standards.

Bundesanstalt fuer Arbeit
85 Nuernberg; Regensburgerstr. 104 - Federal Employment Agency.

Bi-National Institutions

German American Chamber of Commerce
Main Office: 666 Fifth Ave. New York, N.Y. 10019 - Branches: 2 Houston Center, Houston, Texas, 77002, Suite 2301; Peachtree Center Harris Tower, 233 Peachtree Street, NE, Atlanta, Ga. 30303; 1 Farragut Square South, Washington, D.C. 20006. Regional Chambers: 77 Monroe Street, Chicago, Ill. 60603; 465 California Street, Suite 1228, San Francisco, Calif. 94104; 3250 Wilshire Blvd., Los Angeles, Calif., 90010.

European Community Information Service
2100 M. Street, N.W.; Washington, D.C., 20037.

Industrial and Trade Associations

Bundesverband der Deutschen Industrie
5 Koeln 51; Oberlaenderufer 84-88 - Association of German Industries.

Bundesvereinigung der deutschen Arbeitgeberverbaende e.V.
5 Koeln 51; Oberlaenderufer 72 - Umbrella Association of employers' organizations; counterparts of the Umbrella Organization of Labor Unions.

Deutscher Industrie- und Handelstag
53 Bonn; Adenauerallee 148 - Association of German Chambers of Industry and Commerce.

DGB Deutscher Gewerkschaftsbund Bundesvorstand
4 Duesseldorf 30; Hans Boecklerstr. 39 - Umbrella Organization of Labor Unions.

Bundesverband des deutschen Gross- und Aussenhandels
53 Bonn; Kaiser Friedrichstr. 13 - Umbrella Organization of exporters/importers and wholesalers.

Hauptgemeinschaft des deutschen Einzelhandels e.V.
5 Koeln 1; Sachsenring 89 - Retailer Association.

Centralvereinigung deutscher Handelsvertreter und Handelsmaklerverbaende
5 Koeln 41; Gereonstr. 6 - Umbrella Association of brokers, agents and representatives.

Gesamtverband der deutschen Versicherungswirtschaft
5 Koeln 1; Gruenplatz 1 - Association of the Insurance Industry.

Zentralausschuss der Werbewirtschaft e.V.
53 Bonn - Bad Godesberg; Villichgasse 17 - Association of Advertising Agencies and Public Relations.

Ausstellungs- und Messeausschuss der deutschen Wirtschaft e.V. [AUMA]
5 Koeln 1; Lindenstrasse 8 - Organization of Congresses and Trade Fairs.

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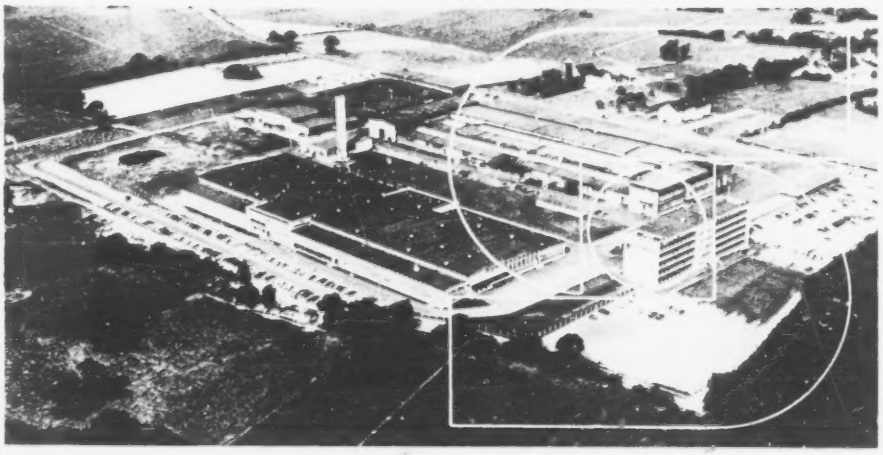
...and Profits



More precisely we pioneered the world famous combined drawing machine and simultaneously introduced a money saving system which, over-the-years, has saved millions of dollars in labor and increased profits for thousands of metal drawers.

Maybe we can save YOU some money. We manufacture a vast variety of metal processing machines, electronic equipment for industrial applications, parts for the automotive, hydraulic, phonotechnical, watch, and other industries.

ASK US, WE MAKE A LOT MORE THAN YOU EXPECT!

SCHUMAG MACHINERY INC.

155 Hudson Avenue, Norwood, NJ 07648

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